

JPRS-TND-91-002  
5 FEBRUARY 1991



# ***JPRS Report***

## **Nuclear Developments**

# NUCLEAR DEVELOPMENTS

JPRS-TND-90-002

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## GHANA

**Nuclear Institute To Introduce New Testing**  
91AF0512Z Accra PEOPLE'S DAILY GRAPHIC  
in English 24 Nov 90 p 1

[Article by Kobby Asmah]

[Text] The National Nuclear Research Institute (NNRI) of the Ghana Atomic Energy Commission (GAEC), through the help of the International Atomic Energy Agency (IAEA), will soon introduce the Non-Destructive Testing (NDT) technology to Ghanaian industrialists, importers and exporters.

The NDT, which is an effective quality control technique, covers the inspection and testing of any material, component or assembly by means which does not affect its ultimate serviceability as well as ensures safety and protection of human life.

Already, the IAEA has pledged to provide the logistic and manpower training whilst funding will come from the United States of America.

As a follow up, an American expert on NDT, Mr E.B. Lewis, is in the country on a four-week fact-finding and evaluation tour on the programme.

Dr A.K. Akafia, chairman of the Ghana Atomic Energy Commission, disclosed these at a one-day seminar on "The World of NDT" organised by the Commission at the NNRI at Kwabenya near Accra yesterday.

## MAURITIUS

**Berenger on SA Ties, Denuclearized Zone**  
91AF0408Z Port Louis LE MAURICIEN in French  
13 Dec 90 pp 1, 4

[Italicized passages published in English]

[Text] The prospects for the establishment of diplomatic relations between Mauritius and South Africa are "encouraging" according to the South African press of late. The SUNDAY TRIBUNE HERALD of 2 December quotes Mr. Paul Berenger, "chief of the Mauritius Militant Movement...keen for the new South Africa to join a regional economic bloc", adding that it believes the Mauritian Government is waiting for clarifications from President De Klerk before moving ahead with a complete opening up of relations with Pretoria.

In his articles, the journalist Dennis Pather also quotes Mauritius' deputy prime minister, Dr. Prem Nababsing, whom he interviewed in Mauritius, and Mr. Jean-Claude de L'Estrac, minister of foreign affairs, who told the business community in a recent conference that the prospects for expanded economic relations with South Africa were opening up in conjunction with political changes in South Africa.

Mr. Berenger is presented as a former hard-liner against South Africa who has changed. The "mellowed Berenger", as he is described, told the SUNDAY TRIBUNE that he is "in love with South Africa."

In an interview this week, he told the Tribune: "I now want to put the record straight. My hatred of apartheid should never be confused with my love for South Africa and its people. It is only the system I hate."

Mr. Berenger, presented as an accredited official of the Mauritian Government in his capacity as adviser to the prime minister on disarmament, declared that all limits to intensified relations between South Africa and Mauritius would disappear as soon as apartheid is abolished. "The sky is the limit," said Mr. Berenger, with reference to postapartheid relations.

Mr. Berenger, who is secretary general of the MMM [Mauritian Militant Movement] as well as adviser to Prime Minister Sir Anerood Jugnauth, also told the South African newspaper that he remains a firm ally of the African National Congress (ANC) that is represented in Mauritius and whose leader, Nelson Mandela, is worthy of admiration. But, the journalist writes, Mr. Berenger "privately admits his annoyance at the movement's apparent lack of organization at home."

On the subject of this dissatisfaction, Mr. Berenger is quoted by the journalist as follows: "What is happening at the ANC headquarters in Johannesburg? Don't they ever bother to reply to people's telephone calls or faxes any more?" he asked in exasperation.

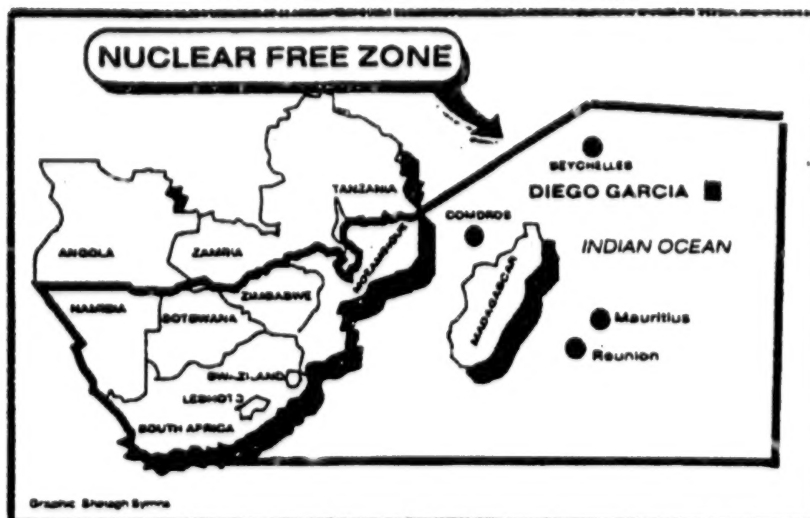
Mr. Berenger recalled for the South African newspaper that when his party rose to power in 1982, one of its first decisions had been to grant official recognition to the ANC, but also to establish relations with other groups "like the then Progressive Federal Party, the Labour Party, the Pan Africanist Congress and even progressive people inside the National Party. Yes, we have some very influential contacts."

According to the newspaper, Mr. Berenger "believes Mr. De Klerk and the government have made very important changes away from apartheid, but has still to be convinced that the process is at this stage irreversible."

"There are certain areas that I would like to clear up with State President De Klerk and the Minister of Constitutional Development, Dr. Gerrit Viljoen. I sincerely hope the opportunity will arise in the near future. Once we are convinced the process is indeed irreversible, we will send the message loud and clear to organisations like the Organisation of African Unity, the Nonaligned Movement, to India and other countries. The sky's the limit for South Africa," he said.

The newspaper recalls that Mr. Berenger is concentrating at present on the establishment of a nuclear-free zone that would include the countries of the southwestern Indian Ocean and southern Africa, South Africa among them. According to the newspaper, the South African

## Denuclearized Zone Proposed by Berenger



The denuclearized zone proposed by Mr. Berenger in the name of the government in a map published by South Africa's SUNDAY TRIBUNE of 2 December. The region outlined on the map extends from Diego Garcia to Namibia and includes South Africa.

Government, through its ministry of foreign affairs, has already contacted "other African countries about declaring the southern African region a nuclear-free zone." Separately, the Agence France Presse [AFP] reports on the plan for a nuclear-free zone put forward by the MMM secretary general who "became a governmental adviser on disarmament problems after the MMM rallied to the government in September." The AFP reports that according to Mr. Berenger, President Albert Rene is in agreement with his plan for a denuclearized zone, which would ban the use or storage of nuclear weapons even on Diego Garcia.

The AFP also reports that Mr. Berenger has said the five countries possessing nuclear weapons (the United States, the USSR, Great Britain, France, and China) will be invited to respect the treaty that he hopes will be signed by the islands of the southwestern Indian Ocean and the countries of southern Africa, including South Africa.

Dr. Prem Nababsing, the deputy prime minister, is cited as having told journalist Dennis Pather that any new Mauritian policy toward Pretoria must have the prior approval of the ANC.

*"We are not going to do anything that will displease the ANC. We do not want to be seen to be overstepping the ANC."*

The newspaper also writes: "Dr. Nababsing said he could not visualise South Africa's being accepted as a member of the Organisation of African Unity (OAU) until blacks in the country are allowed meaningful participation in government."

## Rene Concurr With Proposed Denuclearized Zone

91AF0416Z Port Louis WEEK-END in French  
16 Dec 90 pp 1, 3

[Article: "Seychelles in Total Agreement on Denuclearized Zone"]

[Text] Returning last Wednesday from his first mission to Seychelles as the prime minister's special disarmament adviser, Mr. Paul Berenger said his hosts "expressed complete agreement" with the Mauritian proposal that southwest Indian Ocean and southern African countries sign a treaty to create a denuclearized zone. Mr. Berenger invited Seychelles, a signatory of the nuclear Nonproliferation Treaty, to sit in on the 7-18 January meeting in New York dealing with the Partial Test Ban Treaty, which Seychelles has not signed.

The special disarmament adviser plans to focus next on Madagascar and Zimbabwe. An optimist, Mr. Berenger believes 1991 will be a crucial year in the struggle for a denuclearized zone in our part of the world. There are signs both Zimbabwe and South Africa may be receptive to the Mauritian proposal, said Mr. Berenger, noting that disarmament is not tied to the issues of diplomatic relations or economic sanctions.

On Thursday after his return from the Seychelles, Mr. Berenger announced that Seychelles President Albert Rene had expressed total agreement with the proposal and promised his active support. Seychelles is thus the first country to support the proposal, which was Mr. Berenger's idea.

In the Seychelles, Mr. Berenger met with President Rene and most of his ministers. Now the special adviser plans to turn his attention to Madagascar and Zimbabwe. In a statement to WEEK-END on Friday, Mr. Berenger said

"Zimbabwe's position on the Mauritian proposal will be of critical importance, since that country is one of South Africa's most important neighbors." He noted that Zimbabwe has already been advised of the Mauritian demarche, and an official reaction is expected within the next few days. Mr. Berenger added that initial indications suggest the response will be favorable. If it is, the diplomatic pace may pick up, he said, pointing out that South Africa itself recently has made positive comments about the proposal and said it would not be opposed to making southern Africa a denuclearized zone.

Mr. Berenger did not conceal his optimism about prospects for significant progress in 1991 on the signing of a denuclearized zone treaty for the southwest Indian Ocean and southern Africa. At a certain point in the treaty process, he said, there will have to be talks with South Africa in order to secure its signature. It has been decided, Mr. Berenger told WEEK-END, to keep the treaty separate from the issues of diplomatic relations and economic sanctions. If things continue to move in the right direction, he added, preliminary talks will need to be held between Pretoria and Mauritius, the Seychelles, Madagascar, Zimbabwe—whose role will be of special importance—and the other countries concerned. Mr. Berenger has proposed a treaty zone extending from the Chagos all the way to Namibia, with Reunion included. Fashioned after the Pacific model, the treaty would ban nuclear testing and storage of nuclear weapons within the zone.

#### 1995 Conference

Mr. Berenger said the Nonproliferation Treaty is of fundamental importance to nuclear disarmament. He recalled that Mauritius and Seychelles are signatories of that treaty, but neither country has been actively involved in that issue for some time. A conference will be held in 1995 on the future of the treaty, he continued, explaining that it had been agreed when the treaty went

into force to review it after 25 years. The special conference in 1995 will determine whether to let the treaty expire or renew it for a determinate period. There will be a vote and Mauritius and Seychelles will carry equal weight in the voting, Mr. Berenger said.

According to the prime minister's special adviser, there is a threat hanging over the treaty, which although imperfect is certainly better than nothing. There are countries like Mexico whose position in 1995 will depend on what steps are taken between now and the planned conference by nuclear powers such as the United States, the Soviet Union, Great Britain, France, and China. But Mr. Berenger told WEEK-END that Seychelles and Mauritius have already agreed to exchange information and views in order to harmonize their positions in preparation for 1995.

Mr. Berenger described the Partial Test Ban Treaty as of equal importance for disarmament. As its name suggests, he said, it prohibits nuclear testing in the atmosphere and oceans, but does not bar underground detonations. At the 7-18 January conference in New York, where he will head the Mauritian delegation, the issue will be whether to ban all nuclear testing. There will also be a vote on this question. Mauritius is a signatory of this treaty but Seychelles is not, said Mr. Berenger, who suggested the latter attend the upcoming New York meeting as an observer pending a decision on whether to sign the treaty. He noted that Mauritius has already expressed its hope that two other nonsignatories—France and China—will attend the New York meeting as observers. Also, on his way back to Mauritius Mr. Berenger plans to stop in Paris to discuss Reunion's position with regard to the regional treaty.

The disarmament document, prepared jointly by Mr. Berenger and the Ministry of Foreign Affairs, will be considered next Thursday at the council of ministers before being sent to Mauritian ambassadors overseas and to various concerned countries. It will subsequently be made public.

**Three Stages of Nuclear Development Outlined**

OW2701152491 Beijing XINHUA Domestic Service  
in Chinese 0957 GMT 27 Jan 91

[By reporter Hu Nianqiu (5170 1628 4428)]

[Text] Beijing, 27 Jan (XINHUA)—During the next 10 years, the emphasis of China's nuclear industry will switch from readjustment to development. Under a new system that incorporates the military and the civilian sectors, the nuclear industry will unfold its plan, lay its foundation, raise its standards, increase its efficiency, and acquire a greater capability and power for sustained development.

This was disclosed by a press spokesman of the China National Nuclear Corporation at a press conference on 26 January. He said: The China National Nuclear Corporation held a work conference a few days ago to sum up the achievements and experiences in readjusting the nuclear industry to serve the civilian sector, and to make plans for future work.

The spokesman said: China's nuclear industry will develop in three phases in the future.

Phase one, from 1991 to 1992, when the primary concern will be to further ensure success in improving the economic environment, rectifying economic order, and deepening reform. The first-stage project of the Qinshan Nuclear Power Station and the No. 1 Generating Set of the Dayawan Nuclear Power Station will be completed and put into operation, signifying a breakthrough for the Chinese mainland, which has yet to possess a nuclear power plant. The development and application of nuclear technology and the production of civilian products will be reinforced and developed during the course of the economic improvement and rectification campaign.

Phase two, from 1993 to 1995, when the construction of nuclear power plants will continue. Construction of the two 600,000-kw [kilowatt] generating sets of the second-stage project, and the 300,000-kw generating set of the minor second-stage project of the Qinshan Nuclear Power Station will separately enter their peak periods, and the No. 2 Generating Set of the Dayawan Nuclear Power Station will be completed and begin to generate power. Furthermore nuclear technology will be more widely applied in all sectors of the national economy, and diversified operations will lead to the formation of key products and industries.

Phase three, from 1996 to 2000, when the nuclear industry will see the completion of nuclear power plants with installed capacity of about 6 million kw. Uranium resources, the nuclear fuel industry, and the auxiliary projects for nuclear power will develop accordingly. Nuclear technology industry will further expand, and diversified operations will steadily develop on a scale that gives them economic significance.

It was also learned that China's nuclear industry has switched course after readjusting its product mix and production structure over the past 10 years. While it used to serve only the military, it is now geared toward the peaceful use of nuclear power and technology by incorporating the military and the civilian sectors. At present, the nuclear industry has become a new and high-technology industry, which is mainly designed to develop nuclear power, civilian products, and foreign economic relations and trade; which is technology-intensive; and which has a complete line of products. Statistics show that last year, the output value of civilian goods produced by the nuclear industry accounted for 48 percent of the total output value of the nuclear industry, up from 4.7 percent of 1980.



## JAPAN

### Talks Link Possible Nuclear Agreement With IAEA

OW2501141091 Tokyo KYODO in English 1335 GMT  
25 Jan 91

[Text] Beijing, Jan. 25 KYODO—Soviet Ambassador to China Nikolay Solovyev said Friday that normalization of diplomatic ties between Tokyo and Pyongyang would be very significant for the cross-recognition of North and South Korea and their entry into the United Nations.

Solovyev also said in an interview with KYODO news service that North Korea should accept inspection of its nuclear facilities by the International Atomic Energy Agency (IAEA).

Japan, which is set to begin talks on diplomatic ties with North Korea to normalize bilateral ties on January 30 in Pyongyang, has linked full normalization of bilateral ties to a Pyongyang agreement to conclude a nuclear safeguards agreement with the IAEA.

North Korea ratified the nonproliferation treaty of nuclear weapons in 1985, but has not allowed mandatory IAEA inspection of its nuclear facilities to ensure they are utilized only for peaceful purposes.

The Soviet ambassador said North Korea has not developed nuclear weapons.

Solovyev said cross-recognition would promote stability and reunification of the Korean peninsula and that if the normalization of ties between Japan and North Korea is realized, it will follow the normalization of relations between Pyongyang and Washington.

He said North Korea's proposal of one seat and two representatives for the two Koreas in the U.N. is not realistic.

### MITI Minister Calls for Nuclear Fuel Cycle

OW2301034391 Tokyo KYODO in English 0313 GMT  
23 Jan 91

[Text] Tokyo, Jan. 23 KYODO—A call from International Trade and Industry Minister [MITI] Eiichi Nakao on Wednesday for further efforts to establish a nuclear fuel cycle was supported by Japanese electric power industry leaders, government officials said.

Nakao said in a meeting with the heads of major electric power companies that steady development of nuclear power generation is indispensable for securing a stable, long-term electricity supply, the Ministry of International Trade and Industry officials reported. Nakao argued this requires early establishment of a nuclear fuel cycle consisting of enriched uranium production, recycling of spent fuel, and reservation of low-level radioactive waste.

In response, Sho Nasu, president of Tokyo Electric Power Co. and chairman of the Federation of Electric Power Companies, said the utilities companies will make every effort to promote nuclear power generation and establish the cycle. Nasu stressed the importance of recycling spent fuel.

Japan lacks the facilities for a nuclear fuel cycle, and has been dependent on countries with advanced nuclear technology, like the U.S., France, and Britain, for uranium enrichment and fuel recycling.

The utilities firms are building the facility for a cycle in Rokkasho, Aomori Prefecture. Nasu said he has great interest in the election for governor of Aomori, scheduled for February 3.

Nakao also called on the electric power suppliers to sustain their energy-saving efforts through streamlining for as long as possible.

## NORTH KOREA

### DPRK Hints Intention of Accepting IAEA Inspection

SK31010820 Seoul CHUNGANG ILBO in Korean  
29 Jan 91 p 2

[Report by correspondent Pang In-chol from Tokyo]

[Text] It has been learned that with the first round of North Korean-Japanese full-dress talks for the normalization of state relations at hand, slated for 30-31 January in Pyongyang, party Secretary Kim Chong-il in the middle of this month called his seven closest aides and directed them to "conclude the matter of normalizing state relations sometime in November" by assuming a flexible attitude toward the pending issues.

According to a Japanese source well informed on North Korean affairs, on 29 January Kim Chong-il noted no need to be confined to the question of "one Korea" and "compensation for the 45-year postwar period" and suggested his intention of accepting the inspection of nuclear facilities by the International Atomic Energy Agency—a question which is likely to be the biggest obstacle at the talks.

In connection with this, Yi Kwang, chairman of the Union of Democracy and Reunification of Koreans in Japan, met with the press on 28 January and revealed that Kim Chong-il's direction to hasten the establishment of state relations with Japan is aimed at the assets of Koreans in Japan, which amount to approximately 20 trillion yen, together with compensation from Japan.

**Drive for S&T To Include Nuclear Weapons**

912C0047A Seoul SIN TONG-A in Korean No 12,  
Dec 90 pp 212-228

[Article by Kim Chol-hwan, professor of metal materials science at the National Defense College: "North Korea's Science and Technology Levels—An Intensive Analysis"]

[Excerpt] [passage omitted]

**North Korea's Military Technology Levels**

North Korea had set forth its basic policy directions based on Kim Il-sung's *chuche* ideology of "self-reliant national defense"—an effective combination of highly efficient modern weapons and less efficient weapons, operations of weapons systems that fit in with characteristics of the terrain in the Korean peninsula, operations of weapons systems based on the strategy of surprise attack and the speed battle, as well as development and production of unique North Korean-type weapons—and along these lines it has developed its military S&T and weapons systems.

At present, North Korea is among the world's leading military giants as far as conventional arms are concerned, maintaining diverse weapons systems ranging from old-type, obsolete weapons to high-performance precision ones, which, like in most of the communist countries, primarily consist of Soviet-made weapons. Meanwhile, it appears that North Korea will sooner or later be capable of making nuclear weapons, a fact posing a serious threat to our security.

To compare military S&T in each category, South Korea in the ground weapons area developed and deployed for combat purposes 88-ROK tanks and armored cars. It remodeled M-47 and M-48 tanks for higher performances and qualitative improvements. It also acquired technology and produced 500MD helicopters in conformity to the Korean terrain and the demands of tank warfare.

North Korea has the capability of designing and manufacturing small arms and guns totally on its own. It is self-developing and self-supplying materials for firearms such as carbon steel and chrome steel. As for tanks, it has not yet fully developed its own designing capability, but is capable of imitation designing. In the case of T-72 tanks in particular, North Korea is producing them domestically with Soviet support.

North Korea has the capability of independent designing and imitation designing on power and suspension devices for mobile equipment, although it is experiencing difficulty in the development of new-type armor materials like ceramics. Inasmuch as it has experience in the production of heavy-class vehicles, its technology seems to be at fairly high levels in heat treatment, welding, cutting, and instrumentation. However, due to a lagging in electronics, it is presumed that in the

computer and laser application areas that are essential to firing control, North Korea is in the phase of basic research.

In the maritime-weapons areas, South Korea, besides the existing warships, has been developing, and deploying for combat purposes, ROK-type warships of superior performance, including escort and patrol ships, guided-missile and high-speed boats, to make up for the numerical inferiority. In the shipbuilding area, North Korea can mass produce submarines and, based on its experience in shipbuilding in recent years, it is considered to have reached fairly high levels in the designing technology on high-speed vessels.

Also, North Korea can self-produce ship steel and other materials and supplies needed in warship building. While importing high-tension steel and other special materials from Japan and elsewhere, it maintains the processing and welding technologies for the hull. Although North Korea is not fully capable of independently developing or designing warships, it presumably has the designing capability for remodeling existing ships. The designing for each type of ships is largely standardized by modes imitating foreign ships or based on experience.

**Producing Scud Missiles on Its Own**

North Korea's submarine technology is particularly noteworthy. In the 1960's, it imported submarines from the Soviet Union and China to secure servicing and maintenance abilities. It has since the 1970's completed imitation designing and mass-production systems for R-class submarines. North Korea also has the capability of designing and building small-type submarines independently.

In the aeroweapons technology, South Korea gained its military and nonmilitary aircraft maintenance capability by the mid-1970's and, on that basis, started its aeroindustry in real earnest; the licensed production of the 500MD helicopter and the servicing of military aircraft by Korean Air Lines came in 1976, and the engine servicing on military planes by Samsung Precision in 1979. The assembly production of F-5E fighters began in South Korea in 1981 and, since then, South Korea's aircraft production has made great strides.

At the outset of the 1980's in particular, South Korea began the assembly production of helicopters, fighter planes and engines as well as exports of fuselage and engine parts.

South Korea has lately been participating in the international joint developments and production of helicopter fuselages and fuselage parts for B747, MD-11, MD-80 and various other large-type airliners, earning more than 60 billion won in 1988. The earning rose to a 900 billion-won level in the middle of 1990 and an annual growth as steep as 31 percent is expected. Recently, South Korea, with a view to fostering the domestic aeroindustry, also began the F-18—the next-generation

fighter—production through the introduction of technology. It is thus stepping up efforts to secure aeroindustry technology.

North Korea developed its own maintenance capability for its Air Force that grew rapidly with the Soviet and Chinese aid after the outbreak of the Korean war. Based on that capability, it appears to be self-producing the required parts. Meanwhile, since the beginning of 1970, North Korea has made painstaking efforts to achieve the goal of manufacturing MiG fighters on its own, expanding plants and introducing the technology. It began by importing partly assembled parts and turning them into completely assembled parts. And through the phases of technology accumulation and the buildup of a parts manufacturing capability, North Korea presently has the capability of producing fighter planes under technological tieups.

Especially, in the materials for aircraft, North Korea has developed and is self-supplying most of them except precision materials such as titanium and other special steel for high temperature and special glass. It is anticipated that North Korea will have the synthesizing technology for application in the mid-1990's to produce special steel, special glass, and other precision materials.

In the aircraft-designing technology, it is known that North Korea had lacked until the 1980's such special facilities as wind tunnels essential in the designing process, and had to make great efforts to acquire technology in that area. The accumulation of technology is likely to begin in the early 1990's when it will come to have the main facilities it needs.

It is unlikely that North Korea has the capability of producing fighter planes on its own; however, judging from the fact that the technology introduction and production is under way on MiG-21's and that aircraft manufacturing-related facilities are under construction in large numbers, it appears to have accumulated a substantial amount of technology in the fuselage-manufacturing area. Nevertheless, North Korean potential in aeroelectronics and communication technologies are considered seriously backward.

As regards guided missiles, due to the backwardness of the electronic industry, it is seen as difficult for North Korea to produce them on its own. Seemingly, however, it will be able to produce antitank missiles (AT-1, AT-3) if technology and major parts are imported from other countries.

In the materials development technology, North Korea is seen to have no development capability yet for infrared rays, optical electronics, and precision machines, but appears capable of self-supplying materials for missile bodies, warheads, and propellers. In the meantime, although it has the designing capability on hardware, that on software appears to be no better than a level of conceptual designing. However, owing to Chinese and Soviet technical support and its own intensive research,

North Korea is likely to secure its system-designing capability within the next several years.

Also, despite the lack of development capability for infrared rays and search aircraft, North Korea is producing SA-7's. Judging from this point, North Korea must be producing, either independently or by imitation, some parts by an assembly production mode based on disassembling and foreign-supplied parts, and with Soviet technical assistance. North Korea appears to be producing Scud-B missiles presumably either by imitating Soviet Scud missiles or independently with Iran's financial support and Egypt's technical support.

North Korea's electronic communication equipment is a field most underdeveloped as a victim of the policy giving priority to heavy industry. Products are limited to military telephones and small-type telephones. For things like binoculars, telescopes, and night-vision equipment, it makes them with imported precision parts and by imitating Soviet products.

Especially, with high-precision technologies—including those involving guiding and control devices for missiles and various monitoring equipment for military use, and laser-applying technology and optical communication technology—North Korea presumably still lies in an elementary stage. It is an area, however, on which North Korea is likely to concentrate its development efforts in the future. Should it successfully import technologies from Western industrial democracies, it appears possible to reach an application phase in the 1990's and embark on their practical use in the 2,000's.

#### **To Develop Nuclear Weapons Within Three to Six Years**

Views widely differ on North Korea's ability to develop nuclear weapons. First of all, North Korea has a natural uranium mine in a hilly area north of Pyongsan 50 kilometers northwest of Panmunjom producing quality ores of a 0.5 percent-0.8 percent concentration that can be used directly as reactor fuel after electric refining processes. The deposits are estimated at 26 million tons. At present, North Korea has approximately 2,500 nuclear specialists. Although it became a signatory of the Nuclear Nonproliferation Treaty (NPT) in 1985, it has been refusing to sign a nuclear safety agreement with the International Atomic Energy Agency (IAEA). Judging from these points, the possibility of North Korea's developing nuclear weapons seems basically high.

Let us take a look at nuclear power facilities in North Korea. An experimental 1,000-kw nuclear reactor was imported from the USSR and installed in Yongbyon in June 1965 (upgraded to 3,000 kw's in 1970), marking the start of nuclear power research. An agreement was reached with the USSR in December 1985 on the construction of a 1.76 million-kw nuclear power plant. In December 1986, a second experimental reactor (30,000 kw's) was installed in the Yongbyon nuclear power



research center. Also, the construction of a third nuclear reactor (200,000 kw's) began in 1985 for scheduled completion in 1992.

North Korea began the construction of nuclear fuel reprocessing facilities and nuclear processing facilities in 1985, which are likely to be completed within the next two to three years. It also has a nuclear bomb detonator testing facility where high explosion tests were carried out on about 70 to 80 occasions between 1983 and now.

North Korea retains more than 3,000 persons in research manpower and technical personnel. If it increases investments to develop nuclear weapons at the point of time when it has developed technologies for uranium ore dressing and refining, nuclear fuel rod manufacturing, and for nuclear fuel reprocessing processes to obtain plutonium (Pu-239), it can be anticipated that North Korea will come to have nuclear weapons in three to six years' time.

North Korea, following the Soviet S&T policy with foreign countries as an example, has so far held to closed policies keeping the training of essential technical personnel and S&T researches on a self-dependent basis. In fact, however, it has come to the limits of such developments. Battling to overcome the limits of its self-reliance policy, North Korea has lately been making all-out efforts to acquire new S&T from Japan and other Western nations and to imitate them.

North Korea enacted in September 1984, a joint venture law to promote economic and technological exchanges and joint investments with foreign countries. It also revised its old "cooperation" pattern of agreements signed with communist and Third World countries, replacing it with the private-exchange pattern. The North Korean principles of S&T exchanges include these points: international developments of resources owned by a third nation; mutual exchanges of experience and technology; profitable utilization of oil resources and use of the accumulated funds for further developments; and further strengthening of the international revolutionary forces and their solidarity. [passage omitted]

#### **Nuclear Arms May Be Available by 1995**

SK2401135491 Seoul YONHAP in English 1330 GMT 24 Jan 91

[Text] Seoul, Jan. 24 (OANA-YONHAP)—North Korea will be able to arm itself with nuclear weapons after 1995 as it is expected to secure lots of plutonium in one or two years, Defense Minister Yi Chong-ku warned Thursday.

Speaking in the National Assembly interpellation session, Yi said that there is a persistent fear over a large-scale surprise attack from North Korea, which has lots of chemical weapons and in-house version of Scud missiles and is superior 1.6 times to the South in its war potentials. "However, it is enough to contain the North

Korean military threat, when considering the United States forces stationed here," the top defense official said.

The South, Yi said, is operating an early warning system in preparation for possible surprise attack by the North. He said the North Korean forces are deployed in the frontline positions. "By taking advantage of the early warning system owned by the Korea-U.S. Combined Forces, any provocations by the North can be put back," he said.

Yi said it is unlikely that the United States will swing its forces here to the Gulf as such a move is feared to create a second front in the Korean peninsula. "The possibility, however, cannot be ruled out completely in case the war drags on and expands," he said.

If Saddam Husayn gains what he wants from the current war, North Korean leader Kim Il-song is likely to be tempted to provoke a war against the South, Yi said.

## **SOUTH KOREA**

### **Seoul To Develop Nuclear Reactor Before 2000**

SK2901022091 Seoul THE KOREA HERALD in English 29 Jan 91 p 2

[Text] Korea plans to develop an advanced type of atomic reactor without foreign aid by the turn of this century, Technology and Science Minister Kim Chin-hyon said yesterday.

In a report to President No Tae-u about his ministry's major projects this year, Kim said that his ministry will work out a mid- and long-term atomic energy development program by the first half of this year which will include domestic development of a nuclear reactor.

With self-reliance in the areas of atomic reactor and nuclear fuel, Minister Kim said in the report, Korea will be able to join the elite groups of the world's advanced countries in the nuclear energy field by early next century.

The planned next generation of Korea's nuclear reactor will be more fuel-efficient and safer than any existing model of reactor, Kim said.

Korea is now near totally depended on imports for its fast-growing nuclear power-generation capacity.

Atomic energy currently accounts for half of Korea's total electricity supply, and the portion is expected to increase further in coming years as Korea places increasing emphasis on nuclear energy to reduce its reliance on oil.

The Gulf crisis is expected to give a fresh impetus to Korea's ambitious plan to expand its nuclear power generation capacity.

Minister Kim also said that his agency will soon complete technology to use waste heat from atomic reactors for room heating in the areas adjacent to the power plants.

The ministry will provide extensive financial support to such high-tech areas as space and aviation, computers, bioengineering, petrochemical and marine science which Kim said will dominate the global market in the next century.

Kim reported to No that Korea should develop its own superior technology and goods which he said will monopolize the world market, to maintain its hard-won status as one of the world's top 10 trading powers.

He noted that Japan, with its superiority in VTR [video tape recorder] technology alone, has monopolized the world's \$300 to 400 billion global VTR market. To meet the government's goal to raise the country's investment in technology research and development to the 5 percent level of its GNP [gross national product], Kim said, that his agency will study various ways to boost public and private investment in R&D.

The ministry will also place greater emphasis on expansion of technology cooperation with the Soviet Union this year, Kim said.

As part of this endeavor, the minister said, it will open a Korea-USSR scientific technology cooperation center at the Korea Institute of Science and Technology this year. The center, agreed upon by the two countries during No's visit to Moscow in December, will play a leading role in promotion of technology exchanges between the two nations.

The ministry will also propose to North Korea exchanges of scientists and joint research in such projects as ecological survey in the Antarctic area and in and around the Korea peninsula, Kim said. The ministry also plans to complete the project to expand the Taedok Science Town by 1992 to accommodate 60 more research institutes, he said.

The ministry envisions to combine the town with the science pavilion of the Taejon International Exhibition, now under construction, and make it the country's first science park.

#### **Ministry To Study Radioactive Waste Control**

SK1401151091 Seoul THE KOREA ECONOMIC JOURNAL in English 14 Jan 91 p 4

[Text] The Ministry of Science and Technology will prepare in 1991 a five-year plan to promote research in basic science at academic institutions.

The ministry will increase investment in government-sponsored research and development projects at government and industrial laboratories.

In addition, the ministry will draft a master control plan for radioactive waste of atomic power plants to cope with the public's increasing concern about such waste. The master plan will include a program to dispose of medium- and low-grade radioactive waste and another for establishing a radioactive waste control fund. It will call for establishing rules governing the transportation of radioactive materials.

## CZECHOSLOVAKIA

### Envoy Supports Global Nuclear Test Ban

LD1101105991 Prague CTK in English 0847 GMT  
11 Jan 91

[Text] New York, Jan 11 (CTK)—Czechoslovakia believes that a global nuclear test ban should be asserted gradually in new conditions of the development of international relations, Czechoslovak Permanent Representative in the U.N. Eduard Kukan said here yesterday.

He added that use should be made of the Soviet-U.S. dialogue and multilateral negotiations at the conference on disarmament in Geneva should be extended.

Czechoslovakia's independent foreign policy favours a total nuclear test ban as an inseparable part of the process of the limitation and liquidation of nuclear weapons. According to Czechoslovakia the number of explosions a year should be radically reduced, Kukan said.

Addressing a conference on amending the nuclear test ban treaty by a ban on underground nuclear tests, he voiced satisfaction with the present observance of the treaty. On the other hand, however, the treaty has failed to stop the nuclear arms race and has not met the hope of non-nuclear states for reaching a total nuclear test ban soon, Kukan said.

### Uranium Production Official Data Provided

91CH0216C Prague HOSPODARSKE NOVINY  
in Czech 14 Dec 90 p 3

[Article by rs: "First Official Data on the Production of Uranium in Czechoslovakia—A Change in the Concept of the Discontinuation of Production in Favor of Nuclear Energy"]

[Text] Next week, the Federal Government should discuss the proposal for a change in the concept of the discontinuation program for the extraction of uranium in the CSFR, which was adopted by the Adamec government on 19 October 1989. This step is impatiently awaited by not only the leadership of the Czechoslovak Uranium Industry State Enterprise (CSUP) and its 22,286 employees, but also by the broad public because it is generally known that the extraction and processing of uranium ore is expressly subsidized in our country by the state treasury. The discussed material was made available to the editors of HOSPODARSKE NOVINY, complete with numerical data regarding the quantities and prices which could hitherto not be published.

The reasons which led to approval of the discontinuation program in 1989 were economic and political in character. The state had to subsidize the extraction and processing of uranium relatively heavily (approximately 2 billion Czechoslovak korunas [Kcs] per year) and the change of political conditions in Europe made it possible

to perceive uranium no longer as a strategic raw material, but as an exclusively energy-type raw material. The pace of discontinuation was optimized in such a manner as to reduce the production of uranium by closing down the most heavily money-losing mines (uranium production meant here is the chemical concentrate of uranium dioxide) from 2,400 tons per year in 1989 to 1,250 tons in 1997 so that by the year 2000 subsidies payable to the uranium industry would be lowered to zero. The basic prerequisite for the approved discontinuation program was the persisting acceptance of all uranium by the Soviet Union, with the exception of six to nine percent of production intended for Western markets. The approved discontinuation program would have required subsidies of Kcs13.3 billion by the year 2000.

### Changes in the Initial Conditions

Under the new conditions of management and given the commercial relationships, the discontinuation program of 1989 is not satisfactory for a number of reasons:

1. Effective 1 January 1991, the Soviet Union will receive only as much uranium as it requires for the production of nuclear fuel for our electric power plants from Czechoslovakia (the USSR has sufficient supplies of uranium and a shortage of freely convertible currency).
2. According to state structural policy, uranium becomes a resource component of the national fuel and energy balance.
3. The slowdown and deferral involving the construction of nuclear power plants in Czechoslovakia (in contrast to the anticipations of 1989) has resulted in the estimated requirement for uranium to be lowered from 18,250 tons to 12,469 tons by the year 2000.
4. The social aspects of discontinuation are changing by increasing the quality of social health care for miners in uranium mines.
5. There are other generally valid reasons connected with the transition to a market economy.

The plan for discontinuing the extraction and processing of uranium which was presented by the Federal Ministry of Mining and the management of the CSUP [Czechoslovak Labor Institute] to the Federal Government sets as its goal the assurance of the availability of nuclear fuel for Czechoslovak power plants from Czechoslovakia's own sources at least through the year 2005 while simultaneously speeding up the pace of discontinuation in a comparison with the original plan; it also calls for a substantial lowering of state subsidies until such times as the sales price and producer price of uranium are balanced; it calls for the efficient utilization of relatively accessible inventories of uranium ore at discontinued and closed mines; and calls for the maximum limitation of unfavorable social impacts upon miners and other CSUP employees.

The fundamental problems with which the CSUP has to come to terms in fulfilling these goals are the currently high costs for extraction and processing of uranium ore and the excessively high volume of production. A logical solution for this status of affairs is the reduction of production to a quantity which is more or less sufficient to supply Czechoslovak nuclear power plants.

It is, therefore, proposed that the government sell Czechoslovak producers of energy their uranium at world prices and that the difference between this price and the production price be equalized out of the state budget until such times as both of these prices become balanced, something which is planned to occur in the year 1996 and something which should be achieved by rationalizing the production of uranium and by a gradual increase in world uranium prices—in other words, a price at which the Czechoslovak energy industry could purchase uranium abroad. According to analyses, Czechoslovakia could purchase uranium on the world market for \$57/kg in 1991 which, at a rate of exchange of Kcs24/\$1 amounts to Kcs1,370. (The price of \$57 would result from the necessity to establish long-term contracts with suppliers.) The production price set for the year 1991 (on the basis of calculations of inputs for 1991) is Kcs1,586/kg. In 1996, both prices should stabilize at Kcs1,513. It should be pointed out that these data are provided in the knowledge of the risks and uncertainties which are difficult to estimate during the current period.

Moreover, it is necessary to correctly perceive the formulation regarding prices at which the CSFR could import uranium from abroad. This is really a matter of price comparisons because, in practical terms, Czechoslovakia cannot purchase uranium on the world market because fuel for the Soviet VVER 440 and VVER 1000 reactors must be produced for us by the Soviet Union

and the USSR is only willing to use our raw material for these purposes or its own chemical concentrate. In other words, the government can decide only between the possibility to subsidize the price of our uranium or to purchase Soviet uranium. However, the Soviet Union is demanding not \$57/kg, but \$90/kg, which is the upper limit of the price resulting from long-term agreements.

This is the method proposed by the CSUP for solving the subsidizing of the production of uranium destined for the Czechoslovak energy industry and it can be said that whatever is extracted in excess of these requirements, merely without being utilized, constitutes a burden on the state budget. To restrict extraction to the necessary minimum, however, is not possible from day to day because of social and financial reasons and because of the nonconstant consumption of uranium by the Czechoslovak energy industry, consumption which is determined by the activation of new nuclear power plants and the discontinuation of operations of old nuclear power plants.

The graph [not published] as well as the table indicate that during the period through 1994 significant overproduction of uranium will occur, whereas after 1995 there will be a deficit. In view of the technically and economically unrealistic character of the immediate adaptation of the volume of uranium extraction to the requirements of the energy industry in the individual years between 1991 and 1994 without excluding the risk of the irrational utilization of uranium inventories in long-term deposits, the management of the CSUP proposes that uranium be either temporarily stored as part of the Federal Material Reserves or exported to the world market, but gives priority to the first variant. The price consequences and relationships involved in exports, imports, and storage for both variations are shown in the accompanying table.

**Basic Indicators Involved in the Amendment of the Discontinuation Concept Pertaining to the Extraction of Uranium in Various Alternatives**

	1991		1991-95		1996-00		1991-00		2001-05	
Indicator: Quantity in Tons; Monetary Expenditures; in Millions of Kcs	a	b	a	b	a	b	a	b	a	b
Overall requirements	768	768	5495	5495	6974	6974	12469	12469	9200	9200
Including:										
Direct deliveries by CSUP	768	768	4897	5029	6300	6300	11179	11329	6200	6200
Purchases from Federal Material Reserves	x	x	616	x	674	x	1290	x	1281	x
Imports	x	x	x	466	x	674		1140	1719	3000
Overall uranium production	1850	1850	8200	8200	6300	6300	14500	14500	6200	6200
Including:										
Direct deliveries of energy	768	768	4879	5029	6300	6300	14500	14500	6200	6200
Sales to Federal Material Reserves	932	x	2571	x	x	x	2571	x	x	x
Exports	150	1082	750	3171	x	x	750	34171	x	x

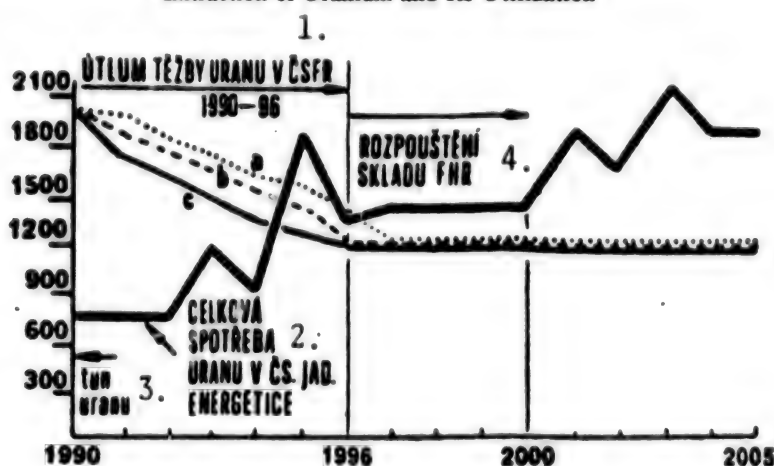


**Basic Indicators Involved in the Amendment of the Discontinuation Concept Pertaining to the Extraction of Uranium in Various Alternatives (Continued)**

	1991		1991-95		1996-00		1991-00		2001-05	
Coverage of requirements of Czechoslovak energy industry with domestic uranium (in percent)	100	100	100	91.5	100	90.3	100	90.9	81.3	67.4
Overall expenditures from state budget	2261	1574	6819	4725	730	730	7549			
Overall subsidies paid to CSUP	984	1574	3218	4725	730	730	3948	5455		
Revenues and expenditures from state budget for purchases and resulting from sales to Federal Material Reserves	- 1277	x	- 2687	x	+ 1061	x	- 1626	x		
Balance of expenditures and revenues of state budget	2261	1574	5905	4725	- 331	730	5574	5455		

Alternative: a) Storage of temporary uranium overproduction as part of Federal Material Reserves with subsequent sales to Czechoslovak energy industry.

Alternative: b) Exports of temporary overproduction to world markets, followed by necessity for imports as of 1996.

**Extraction of Uranium and Its Utilization****Key:**

- 1. Discontinuation of uranium extraction in the CSFR
- 2. Overall consumption of uranium in the Czechoslovak nuclear energy industry
- 3. Tons of uranium
- 4. Dissolution of the Federal Material Reserves stockpile
  - a) Extraction in accordance with the original discontinuation plan
  - b) Extraction in accordance with the changed concept
  - c) Utilization of uranium for the CSFR

The advantage of storing uranium in the Federal Material Reserves is the recoverability of the funds expended for the purchase of uranium, the savings in foreign exchange for necessary uranium imports for nuclear power plants after 1994, the prevention of losses of part of a domestic product through inefficient exports, and the fact that the Czechoslovak nuclear energy industry will be protected against all fluctuations in the world uranium markets through the year 2003.

However, the disadvantage is the long-term tying up of gross national product in the form of inventories. If storage in the Federal Material Reserves is burdened with an interest rate of 13 percent of the tied-up capital, the expenditures from the state budget for the period 1991 through 2000 will increase by approximately Kcs3.9 billion required for its replacement. This means that the price of uranium stored in the Federal Material Reserves would grow on an average by Kcs1,600 over a period of 13 years.

In the event the overproduction of uranium is solved through exports, it is contemplated that an export price averaging \$36/kg (Kcs864) will be achieved. Given this money-using export activity in the period 1991 through 1994, the alternative of selling all surplus production abroad for the period 1991 through 2000 is just as expensive for the state budget as is the alternative calling for storage as part of the Federal Material Reserves.

The advantage of exporting uranium is its foreign exchange revenue; the disadvantage, however, is the nonrecoverable loss of created gross domestic product. Moreover, the exported uranium will later be missing from the fuels and energy balance and will have to be imported at higher prices than those for which it was exported, or domestic extraction will have to be increased.

In view of the fact that it will be unrealistic to sell all surplus uranium production the moment a foreign market is entered and, to the extent to which this is possible, sales will have to be at the lowest "spot prices" (\$22-30/kg), the management of the CSUP is recommending that consideration be given to selling approximately 500 to 650 tons per year. The remaining uranium from surplus production should be temporarily stored as part of the Federal Material Reserves for later presupply to the nuclear electric power plants at Mochovce and Temelin, which are under construction, or for sale under more advantageous conditions. In storing uranium as part of the Federal Material Reserves, the uranium can serve as a material guarantee for bank credits abroad.

The table indicates that the overall balance of expenditures and revenues of the state budget for the years 1991 through 2000 does not expressly exceed Kcs5.5 billion in the case of either of the two variants, which is substantially less than the Kcs13.3 billion set aside for subsidizing the CSUP as a result of the original discontinuation plan approved in October 1989. However, the financial balance between both variations is only an apparent one because in storing uranium as part of the Federal Material Reserves, the state would still own inventories valued at Kcs1.6 billion in the year 2000 and the balance would thus decline to Kcs3.9 billion and the subsidies would decline by Kcs9.4 billion in comparison to the original plan.

One of the possibilities which would also solve the overproduction of uranium is, naturally, its radical restriction. However, according to the management of the CSUP, this would have the following consequences: the nonutilization of residual inventories destined for extraction at operating and discontinued mines; an express increase in unemployment; an emergency increase of expenditures involved in technical liquidation of operations and in social security and the early dependence of the Czechoslovak energy industry upon uranium imports. In the event of the importation of substantial quantities over a longer period of time, it would be necessary to figure on a price ranging from \$80-100/kg. It must also be realized that after a mine is

closed, the inventory of uranium is definitively lost because extraction cannot be renewed or because the reopening of the mine would be unbelievably expensive. This is true both for the discontinued mining operations in western Bohemia, in Příbram, at Dolní Rozínice, as well as for the regions which hold long-term promise, for example, areas in northern Bohemia.

## Fire at Nuclear Plant

### No Radiation Leak

LD1601212791 Prague CTK in English 1521 GMT  
16 Jan 91

[Text] Bratislava Jan 16 (CTK)—Director of the nuclear power plants at Jaslovské Bohunice, West Slovakia, Juraj Kmosena told CTK here today that a fire broke out in the second unit of the V-1 plant on Tuesday, but was put out soon.

According to the director, the fire erupted at a 0.4 kw switchboard which is now being repaired. At the same time the second unit of V-1 was shut down.

Kmosena said that no radioactivity leaked within the plant's complex or to its surroundings. It is envisaged to restart the second unit within four days.

The plant's director told CTK that by the scale of the International Atomic Energy Agency (IAEA) this occurrence is assessed as an accident of the first to the second degree of the seven-degree table of nuclear power plants' failures (the seventh degree being the highest)

Director of the nuclear power plants at Jaslovské Bohunice, west Slovakia, Juraj Kmosena also told CTK today that the plant's specialists ascribe the fire, which erupted at the V-1 plant yesterday, to damaged internal insulation of a Czechoslovak-made circuit breaker which caused a small short circuit that led to the ionization of the air. This caused development of the short circuit and the eventual fire.

A group of specialists has been engaged in definitive specification of the cause of the fire, Kmosena added.

His assurance that no radioactivity leaked during the accident to the plant's complex or to its surroundings was confirmed later today also by the secretariat of the minister of the Czechoslovak Government, a chairman of the Federal Committee for the Environment, Josef Vavroušek.

The Jaslovské Bohunice nuclear power plant is the oldest one in Czechoslovakia. Put into service in the 1970's, it has Soviet-made equipment.

Situated only some 50 kilometres from the Austrian border, it has been the target of an intensive anti-nuclear campaign in Austria for several months. At the end of last year, the Austrian side demanded its immediate closure for safety reasons. However, several foreign teams of specialists, including those of Siemens (FRG),

Westinghouse (U.S.) and the Vienna-based International Atomic Energy Agency (IAEA) recently conducted inspections at Jaslovske Bohunice finding no reason for an immediate shutdown.

The Czechoslovak Government recently said the plant would not be closed down, but recommendations to raise its safety, made by the foreign firms, will be carried out.

There is another nuclear plant at Dukovany, south Moravia, and two more are being constructed: at Mochovce, west Slovakia, and Temelin, south Bohemia. The construction of others is being considered since Czechoslovakia now heavily depends for electricity on thermal plants which burn low-quality brown coal causing serious damage to the environment. The new plants would be built by contemporary standards now applied in western countries which would also supply the equipment.

The nuclear power plants now account for 25 per cent of all electric power generation in Czechoslovakia.

Recently, Czechoslovak Premier Marian Calfa invited Austrian Chancellor Franz Vranitzky to Czechoslovakia for talks on the issue, proposing the end of January or beginning of February as the date for the meeting.

#### **Director Dismisses Danger**

*AU1801172191 Bratislava PRAVDA in Slovak  
16 Jan 91 p 3*

[Interview with Juraj Kmosena, director of Jaslovske Bohunice nuclear power plant, by Lubo Rabay; place and date not given: "It Was Just a Commonplace Accident"; first paragraph is PRAVDA introduction]

[Text] In a news bulletin yesterday morning, Czechoslovak Radio carried a brief report on an accident in a V-1 block at the Jaslovske Bohunice Nuclear Power Plant. Although this was not a serious accident, we asked Engineer Juraj Kmosena, director of the Jaslovske Bohunice Nuclear Power Plant, to give us more information.

[Kmosena] A 0.4 kilovolt distributor in the second block of the V-1 power plant was damaged; several electronic appliances are connected to it. We noticed the problem on Tuesday [15 January] afternoon. A flawed circuit breaker in the distributor caused a short circuit and a fire

in part of the equipment's cabling and connectors. After immediately examining the cause of the accident, the staff shut the block down.

[Rabay] How do you characterize the seriousness of the accident from the point of view of nuclear safety?

[Kmosena] This was a relatively commonplace distributor problem in the electronic equipment and has no connection with nuclear safety. Despite this, we evaluated the problem in accordance with the seven-grade international evaluating system. According to these grades, this was an accident between the first and second grades—that is, between the lowest danger levels this system defines as a mere incident.

[Rabay] What does the accident mean as far as the plant's operation is concerned?

[Kmosena] The plant's second block will be closed down for about four days. Electronic maintenance staff have already removed the fire damaged cables and connectors and are installing new ones.

#### **Manager Denies Sabotage Theory**

*LD1801165391 Bratislava Domestic Service in Slovak  
1100 GMT 17 Jan 91*

[Petr Toman report from Jaslovske Bohunice nuclear power plant; date not given—live o. recorded]

[Excerpt] In connection with a fire at one of the V-1 unit distributors, theories have arisen that this may have been a planned terrorist act, a specific example of the proclaimed Husayn revenge on the countries that sent their units to war against Iraq.

Juraj Komosena, director of the nuclear power plant enterprise, unanimously refuted this version. At issue was exclusively a technical fault. Distribution panels, where the fire started, are located in a place with difficult access. Moreover, since 11 January—or five days before the fire—the power station has been, in the context of emergency security measures, guarded by troops and policemen. Fifteen electricians today are repairing the cable network and circuit breakers in the distribution panels where the fire occurred. The new equipment must, first of all, be tested and the second bloc of the V-1 unit should be restarted around Friday. [passage omitted]



## ARGENTINA

### Embalse Nuclear Plant Resumes Operations 26 Jan

PY2801174591 Buenos Aires TELAM in Spanish  
1303 GMT 28 Jan 91

[Text] Cordoba, 28 Jan (TELAM) — The Embalse nuclear plant resumed operations during the night of 26 January and began supplying the national grid after having been shut down for maintenance, repairs, inspection, and the extraction of Cobalt 60.

This information was given to TELAM by the Public Relations Office of the nuclear plant, which is 120 km south of this capital. The plant resumed operations at 2113 [2313 GMT] on 26 January. It has now been operating commercially for seven years.

## BRAZIL

### Ultracentrifuges To Raise Uranium Production

#### Navy Project

PY2412012690 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 18 Dec 90 p 16

[By Roberto Godoy]

[Text] Ipero—Inside the Navy's Aramar Experimental Center in Ipero, in the Sorocaba Region of Sao Paulo, the demonstration plant building conceals a secret: an impressive line of 550 new high-performance ultracentrifuges that, beginning in March 1991, will help increase the production of three to 20 percent enriched uranium by 10 times. Combined with 48 old units that are in operation, the new centrifuges, which are installed and being tested, comprise a system that will make the country self-sufficient in fuel for research reactors, which supply radioisotopes to 1,700 nuclear medicine clinics.

That is not all. The multiplying effect of private industry's participation in the project undertaken by the Navy's Special Projects Coordinating Office (COPESP) has yielded at least 39 products that are used in 11 different areas of the domestic economy—from the pharmaceutical to the steel-making areas. The expansion of the demonstration plant brings Brazil to the technological development level of Great Britain, the Netherlands, and Germany. By next year, the Ipero Region High Technology Hub [Polo] Foundation will receive the first benefits of this technological development. The foundation will lay down rules for the installation of facilities for the first companies interested in having expertise transferred to them and for the way in which the transfer will be made.

"The advanced materials sector is a priority," affirmed COPESP President Rear Admiral Othon Pinheiro da Silva. In fact, the knowledge gained in the use of carbon fibers and titanium alloys—a spinoff from uranium

enrichment technology—is beginning to show up in the air and space industry: The small positioning motor for the first Brazilian satellite built by the Space Activities Institute (INPE) came from the Aramar Experimental Center.

At present, 1,600 people, including 768 engineers and 32 military engineers, work at the Ipero experimental center and the COPESP installation on the campus of Sao Paulo University. COPESP President Rear Admiral Othon Pinheiro da Silva said: "We probably have the best collection of brains in the country." It is a team of young professionals around 35, who are interested in practical objectives. Commander Paulo Afonso da Silva, a nuclear engineer and the main assistant to Rear Admiral Othon Pinheiro da Silva, says of the team: "It is possibly the first Brazilian generation of 'doers,' with a profile like that of the people who began to fill strategic positions in the United States in the 1960's."

The autonomous program was also successful in gaining the confidence of the people of Ipero, who feared the prospect of radioactive contamination. A public relations campaign initiated in 1987 attracted Ipero public school teachers to a course on nuclear literacy that was designed to win the attendees' confidence. Each year, 8,000 people file through the Aramar buildings, laboratories, and warehouses. At the end of the tour, each visitor receives a small bottle containing "Ara-mel," honey produced in the experimental center beehives. "That is a type of safety certificate," explains Rear Admiral Othon Pinheiro da Silva because "bees never produce honey in a polluted environment."

#### Ultracentrifuges Detailed

PY2412015490 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 18 Dec 90 p 16

[Text] The new ultracentrifuges at the Aramar Experimental Center are probably the fourth generation of uranium-enriching machines built with locally developed technology since 1980. Engineer Paulo Afonso Silva said, "We tried about 30 models." The model that was adopted is a highly sophisticated piece of equipment that is electronically controlled. The magnetic bearings, for instance, require a high degree of precision found only in the navigation systems of space exploration probes that must travel millions of kilometers for years in order to reach a given point with a maximum error margin of centimeters. All the materials, components, and parts of its mechanisms have to meet critical specifications.

The ultracentrifuges spin at 60,000 revolutions per minute, rotating uninterrupted at supersonic speed for at least five years. Since natural uranium (U-238) is not radioactive, it should be "enriched" with one of its radioactive isotopes (U-235); that is, a similar element, although with a lighter, more unstable nucleus. All information on production capacity and methods can be sorted out by the equipment at the Aramar Experimental

Center. The enrichment process is performed by introducing gaseous uranium hexafluoride in the ultracentrifuge axis so that the heavier particles, which contain U-238, can spin outwards and leave the energetically "richer" U-235 at the center. To increase the percentage of enrichment, the material is run 1,400 times through a "cascade" of ultracentrifuges that yield a minimum volume of material enriched to three percent.

Development of this type of equipment gives the country the opportunity to gain expertise in strategic areas like superalloys, vacuum pumps, rare earths, composite materials, pharmaceuticals, and magnetic alloys. In all these projects, COPESP [Navy Special Projects Coordinating Office] adopted the basic policy that the project should be 100 percent national technology and implemented in partnership with Brazilian engineering organizations, and that knowledge acquired in this manner should be applied in other areas. Rear Admiral Othon Pinheiro da Silva said: "Our only restriction was that price and quality should always be equal to that on the international market."

There are currently about 160 industries indirectly linked to the program. Another 40 industries are under direct contracts, working on steel, alloys, welding, vacuum technology, synthetic materials, and coiled steel sheets. Interaction with the industries is constantly unfolding. In Ipero, the first Brazilian-made gyroscope is entering its testing stage, which must last more than one year. In addition to its military uses in the navigation system of ships, airplanes, missiles, and torpedoes, a gyroscope also has civilian uses like orientation of offshore oil platforms or the control of inertial boxes in airliners. The gyroscope gives fixed points of reference, a sort of accurate "north" in relation to certain target coordinates, and allows course corrections.

Pumps and vacuum chambers that came directly from Ipero are being used in packaging foodstuffs. They allow the manufacture of medicine with a much greater degree of purity. All of these projects always begin in the spartan rooms of the COPESP engineers. Dib, Teixeira, and Magalhaes—*noms de guerre* that safeguard identities that are kept confidential for security reasons—have performed very similar tasks for the Autonomous Nuclear Project [Programa Nuclear Autonomo].

After graduating in their specialties—mechanics, electronics, and chemistry—they were invited to join the team with great possibilities for postgraduate courses. The three of them already have spent time abroad at specialization courses. All of them are about 35 and had to quit their postgraduate thesis work because of their work at COPESP.

#### Gains of Bilateral Inspection Accord Weighed

91WP0042A Sao Paulo O ESTADO DE SAO PAULO  
in Portuguese 30 Nov 90 p 3

[Editorial: "Trusting in the Generosity of Others"]

[Text] The signing of the official Brazil-Argentina declaration on binational control of the nuclear facilities of the two countries marks an important step taken not only by Buenos Aires, but also by Brasilia, toward dispelling the ghosts that for more than 20 years have stalked Brazil and Argentina, which have been seen (when not actually accused) as being possible manufacturers of atomic bombs. Oddly enough, few people noticed that during this entire period, the anticipated length of time it would take to build the bomb stayed the same—five years. Now that nuclear facilities are open for mutual inspection by Argentines and Brazilians, with the International Atomic Energy Agency (IAEA) being informed of the results, it is to be expected that the campaign that depicted Brazil and Argentina as potential threats to Humanity—and especially to the countries in that very exclusive club of hydrogen bomb makers—will cease.

No one would deny that during the military era a decision was made in Brazil to use every opportunity available under the Treaty of Tlatelolco, which prohibits explosions and stockpiling of nuclear weapons in the Americas, but permitted the explosion of nuclear devices for peaceful purposes, provided that certain bureaucratic requirements were met. It was on that basis of that document, which has still not taken effect because Argentina has not ratified it—much less did Cuba and France (which has a colony that borders Brazil), agree to sign it—that it was decided, under the Figueiredo administration, to drill those famous holes at the Cachimbo military base. Those holes were totally useless for the intended purposes, given the fact that never has Brazilian research been directed toward a search for sufficient technology to detonate a nuclear device for peaceful purposes. The latter was the diplomatic phrase that the governments of the Americas of that period, whether democratic or not, resorted to when they wanted to say that they desired to achieve technological autonomy in order to master the complete cycle of the atom.

There is an aspect to the declaration signed by Presidents Fernando Collor and Menem that is of utmost importance: the two chiefs of state have played a decisive hand of cards. They are trusting that, when the results of the mutual inspection are made available to the IAEA and negotiations get underway with that agency for the drafting of a joint agreement on safeguards, they will have facilitated their countries' access to new technologies that are indispensable to their development. So far, the developing nations that endorsed the Nuclear Non-proliferation Treaty have gained very little by their abstinence from the atom—if you can call it that. Will the great powers proceed any differently with Brazil and Argentina? Or will they exploit the opening which the two governments are making toward the world of those who have the bomb and its secrets, to maintain restrictions on the sale or transfer of the latest technology? Or do they intend to impose restrictions on the developing governments?

Brazil gave up more than Argentina did when it signed the joint declaration—and this point must be emphasized. This country not only signed the Treaty of Tlatelolco, it also ratified it. Argentina has not ratified it and is therefore bound only by a declaration of mutual inspection. This gesture of generosity should be taken into consideration from now on.

#### **CPI Report Prohibits IAEA Inspection**

*91WP0042B Sao Paulo O ESTADO DE SAO PAULO  
in Portuguese 6 Dec 90 p 22*

[Text] Brasilia—The Commission for Congressional Investigation [CPI] that has been investigating the parallel nuclear program plans to legitimize the controversial projects carried out by the Armed Forces during the past decade when it votes to approve its report today. "The legality of the program is not open to discussion," concludes the report by Sao Paulo Senator Severo Gomes (PMDB) [Brazilian Democratic Movement Party]. The report proposes safeguards to ensure civilian control over the program and prohibits Brazilian facilities from being subjected to inspection by the International Atomic Energy Agency (IAEA). This last recommendation conflicts with President Collor's stated policies.

After eight months of work, the CPI acknowledged that the parallel program had made advances in mastering nuclear technology. "Brazilian technology in the nuclear area must be protected, and research must be encouraged," the report says. Senator Gomes characterizes as "relatively low" the investments in the program, which has consumed \$411 million (60.4 billion cruzeiros) since it was launched in the 1970's. Now that the uranium enrichment cycle has been mastered, the program is expected to lead to construction of a 100 megawatt reactor that would begin operating in the year 2000. The program calls for investments of \$1.9 billion (about 279.3 billion cruzeiros) by the end of the century.

Besides acknowledging the legality of the program, the legislators recognized the need for secrecy regarding the research projects. Accompanying the CPI report is the draft of a law that protects the confidentiality of the knowledge acquired by national technology. The bill also would keep technicians involved in the program from working for private companies either in Brazil or abroad, for a period of two years after they leave the program.

Although it placed its seal of approval on the parallel nuclear program, the CPI urges that the activities be subjected to civilian control. Legislators confirm that during the Figueiredo administration, part of the program was diverted to nuclear weapons development. The congressmen suggested not only that the activities be monitored by a joint committee of Congress, but that authority to formulate nuclear policy be transferred from the Secretariat for Strategic Affairs to the Secretariat of Science and Technology. A nuclear safety commission, subordinate to Secretary of Science and Technology Jose Goldemberg, would be created to replace the National

Commission for Nuclear Energy as program overseer. Its members would be nominated by the president of Brazil, and the nominations would have to be confirmed by the National Congress.

#### **Activities of CTEEx Special Research Institute**

*91WP0051A Rio de Janeiro MANCHETE  
in Portuguese 15 Dec 90 pp 22-27*

[Article by Claudio Accioli: "With His Hand on the Atom"—first paragraph is MANCHETE introduction]

[Text] Moving with precision, the engineer places a cylinder (made of drawn aluminum) containing natural uranium and helium into a panel made of nuclear-grade graphite. All this is taking place at the Special Research Institute in Rio, where the Brazilian Army has almost completed an experimental radiation reactor fueled by natural uranium—technology that still has not been mastered even by the more developed countries. The Army—which for many years kept its nuclear program strictly secret—is opening its doors to MANCHETE. The following pages tell the story of the secret that has been unveiled.

#### **Army Opens Its Laboratory Doors, Unveils Secrets of Brazilian Nuclear Program**

##### **Army Almost Master of Technology Not Even Superpowers Have Mastered**

The mystery has ended. After years of secrecy, the Brazilian Army decided to reveal the nature of the projects that it is carrying out at its Technological Center, a gigantic complex of laboratories in an area of 25 square km at Guaratiba, in the Western Zone of Rio. There, amid various types of activity, scientific curiosity converges on the Special Research Institute (IPE), where research on the construction of a nuclear reactor with state-of-the-art technology is in an advanced stage. The problem is that as a by-product of its operation, the Experimental Radiation Reactor (REI) will generate more plutonium than its counterparts—and plutonium leads to an atomic bomb. It is a hypothesis that General Romero Lemesqueur, secretary of science and technology of the Army, energetically dismisses. "Brazil," he says, "chose not to make the bomb."

One enters the grounds of the Army Technology Center (CTEx) along a narrow road approximately three kilometers in length that from time to time allows glimpses of various modular structures that house the Center's laboratories. The main office of the IPE—and the eight modules that comprise its installations—are located at the end of the road on a kind of plaza. Inside each module is a part of the REI—the infrastructure, equipment, and materials necessary for the faithful reproduction of the operating conditions of each section of the reactor. "Our objective here is solely to master the nuclear process—a technology that we do not yet have in Brazil," the director of the IPE, General Nelson de Almeida Querido, explains. "This goal has virtually been

accomplished. What remains is to work out the details of the project and give it the appropriate dimensions." In other words, one need only put the various parts together in order to achieve the Experimental Radiation Reactor.

The reactor in question is fueled by natural uranium, moderated by nuclear-grade graphite, and air-cooled. It was chosen because it offers the advantage of leading to a technology that has not yet been mastered even by the developed nations. "The REI," the general says, "is the natural way for us to accomplish the construction of a High-Temperature Gas-Graphite Reactor (HTGR)."

#### **The Nuclear Program Involves Atom-Bomb Technology, but Brazil Chose Not To Make the Bomb**

The Army plans subsequently to proceed to the construction of a Modular High-Temperature Gas-Graphite Reactor (MHTGR), which "is intrinsically safe," according to General Nelson. "Under no circumstances would it be subject to a nuclear accident," he says, "because the materials used in its manufacture would resist high temperatures, and its design provides for an underground nucleus capable of dissipating into the soil any residual heat that might be present."

There have been unexpected problems along the way. The REI—which has already consumed \$49 million—will require an additional \$35 million for completion. Because of the high percentage of plutonium the reactor would produce, the Working Group of the National Nuclear Energy Program—in a report submitted to the president of the republic—recommends that the original planned capacity of 20 megawatts (MW) be reduced to five MW. "We may even decide to build the REI with a capacity of two MW," the general reassures us, "because in that case we would need more than 100 years to accumulate the quantity of plutonium necessary to make a nuclear device." There is one detail: if authorization were to be given now, the REI would be ready in 1994.

More than 100 civilian and military technicians—most of whom are engineers from the Military Engineering Institute—put in eight hours a day at the IPE, always under the control of the radiological protection laboratory. They each wear two dosimeters—small metal plaques—attached to their clothing as a kind of badge. One of them uses a crystal which—when heated in the instrument that registers the radiation—emits a luminous beam with an intensity that corresponds to the radiation that may be encountered, with the advantage that it permits an immediate evaluation in emergency situations. No case of contamination has occurred to date.

The REI laboratory that is most subject to exposure to radioactivity is the reactor and radiation physics laboratory, where a subcritical unit is already in operation. With the aim of furnishing models and mathematical parameters for the future project, it functions with aluminum cylinders—containing uranium and helium—that are inserted into a kind of panel consisting of nuclear-grade graphite. "The chain reaction in this unit

is not self-sustaining," General Nelson observes. "It is dependent on the stimulus it receives from a beam of neutrons to sustain itself. It can be controlled."

Informatics—which is involved in almost the entire process—also helps the research project to monitor the safety of the reactor. In the control laboratory, a computer simulates for the technicians the atomic reactions that occur in the equipment, orienting the research toward techniques for controlling these reactions. In practice, however, this research is carried out in a room adjoining the laboratory, where a system has been installed with boron bars capable of absorbing the neutrons that trigger the nuclear reaction. "It is all done with Brazilian technology and equipment," the general says proudly.

Equally vital to the safety of the process is the cooling system of the reactor; it is already completely built in the laboratory itself, although on a reduced scale. It uses filtered air, which passes through the inside of the reactor, is heated, and is again cooled before returning to the atmosphere at the terminus of the system of pipes.

Lastly—and completely filling one of the IPE's modules—there is the "superstar" of the Army's nuclear project: the pilot plant for the production of nuclear-grade graphite, which will be used as a moderating component in the REI. With the success of these experiments, Brazil became only the seventh country in the world to possess this strategic technology. Unlike ordinary graphite—which is found in nature—graphite for nuclear use has to be produced artificially, based on a combination of materials such as coke (pure carbon) and pitch. After a lengthy and sophisticated process that is a closely guarded strategic secret (it includes, among other stages, grinding, pressing, impregnation, cooking, annealing, and graphitization), the graphite bar is ready for use in the reactor.

All this indicates that the nuclear process has now virtually been mastered by the Brazilian Army, save for only a few minor adjustments. All the stages have been completed. What happens now, however, is no longer up to the technicians of the IPE of the CTEEx. General Nelson sums it up this way: "We are waiting for the green light."

But it is not just in the domain of the atom that this planning is going on. Close by the installations of the IPE, the Institute of Research and Development (IPD) is seeking to make Brazil independent in the field of military hardware. Since 1983 hundreds of civilian and military technicians with the most varied backgrounds of training are working there. At present they are concentrating on a 120-mm mortar that is now ready to be adopted by the Army subject only to the final phase of testing, at the Marambaia Proving Ground. The cream of the crop, however, is a land-to-air antiaircraft missile, also virtually completed, subject to test flights. "Nothing here is a copy," declares General Castro Silva, director of the IPD.



The examples of the technology developed here include the manufacture of a thermopile, an energy source that functions only when the electrolyte melts and can therefore be stored for years without discharging. Its second generation (smaller in size) is already in the testing stage and can have various strategic applications, including its use in missiles. "Only four countries in the world possess this technology," General Castro is pleased to say, adding that the intent is to turn the project over to Brazilian industry as soon as it receives final approval.

In another unit—the Laboratory for Special Electro-Optical Sensors—the technicians are perfecting the missile-guidance system. They regard as encouraging the results obtained in the development of infrared ray sources—which make the path of a missile visible to the ground equipment—and also of sensors that capture this emission in order to redirect the course of the missile.

General Romero Lapesqueur, secretary of science and technology of the Army, says the nuclear program that was derived from the Brazil-Germany accord is experiencing difficulties. "They (the countries of the First World, such as Germany) are not interested," he says, "in having the less developed countries possess nuclear technology. They do not want to lose customers. Our objective," he explains, "is to develop technology in the nuclear sector. This will obviously lead us to the technology of the atom bomb, if we so desire. But what we want is the know-how, and we shall not forgo it. Other countries chose to make the bomb. Brazil chose not to make it."

[Box, p 26]

"The independent program of nuclear technology," General Romero Lapesqueur declares, "pejoratively referred

to as the 'parallel' program, is not for the purpose of making an atomic bomb. An analysis of the nuclear question leads to the conclusion that we should possess the technology. We cannot forgo the know-how. The decision as to whether or not to carry out a bomb project—which is not being considered—depends on whether one wants to and has the resources. It is for the government to decide—and the decision is not to make it."

**Second Stage of Satellite Launcher Tested**

PY2412163890 Rio de Janeiro O GLOBO in Portuguese  
22 Dec 90 p 25

[Text] San Jose Dos Campos—Yesterday the Aerospace Technology Center (CTA) tested the second stage of the Satellite Launcher Vehicle (VLS). The successful test lasted 63 seconds and entailed burning 7,257 kgs of solid fuel loaded into a six-meter-long and one-meter-wide tube attached to a testing facility full of electronic sensors.

VLS Project Chief Jaime Boscov reported that the burn generated 60 atmospheres of pressure inside the tube and a propulsion force of 27 tons. A rocket loaded in a similar way could travel over 1,000 km.

CTA computers registered all test results. Technicians will now verify the quality of the materials used in the test and the operation of the rocket's in-flight altitude control system through the data on the behavior of the tubes that exhaust the gas resulting from the burn.

Next year the CTA will carry out two more tests of the second stage and will test the fourth stage. By the end of 1994, all parts will be integrated into a rocket capable of boosting a 150-kg satellite into orbit 800 km above the earth.

## INDIA

**U.S. Stand Could Spur Nuclear Proliferation**

91WD0334A Madras THE HINDU in English  
29 Nov 90 p 8

[Article by Pran Chopra: "In the Nuclear Trap"]

[Text] On the face of it, the United States is taking steps which should help to keep South Asia free of both Indian and Pakistani nuclear weapons. The result, paradoxically, might turn out to be to hasten both countries down the nuclear path and into a nuclear arms race.

If this happens, it will affect all major parameters of India's diplomacy and defence. Most of them will be affected adversely, despite the belief of some defence analysts that India's security structure would become less costly if a nuclear component were added to it, and perhaps relations with Pakistan might also become more stable. Whether the belief is correct or not, it is sufficient for the purpose of the present comments to see whether the recent American pressure on Pakistan not to go in for the bomb will have the reverse effect upon South Asia.

The pressure began a couple of months ago, when the United States announced suspension of aid to Pakistan on the ground that the President, Mr. George Bush, had not found it possible to meet one of the conditions of the aid, that he must certify to Congress that Pakistan was not embarked upon a nuclear weapons programme. While this stated reason clearly related the suspension to this particular nuclear problem, the general feeling in Pakistan was that the pressure had some political aims as well.

**Priority of Aims**

The two aims mentioned most frequently were that, one, Pakistan must hold free and fair elections and not try to twist them around simply for keeping Ms. Benazir Bhutto out of power, and two, that Pakistan must bring down the heat in its relations with India by bringing down its aid to the anti-India militants both in Kashmir and Punjab. There were no clear guesses on whether the nuclear or political aims had a higher priority, or which among the two political aims had it. But all three were considered to be important in Pakistan. An influential newspaper of Lahore, THE NATION, compared the pressure (as seen in Pakistan) to the tactics which the World Bank employs when it uses a request or aid as an occasion for influencing the whole economic philosophy of the requesting country and its approach to development.

**Sop and Warning**

Now that elections are over in Pakistan and the U.S. Government has accepted them as fair (ignoring evidence to the contrary, including some from American sources), attention narrows down to the other two aims. But the American Ambassador in Pakistan, Mr Robert

Oakley, has further narrowed it down to one: American opposition to what is seen to be Pakistan's surreptitious nuclear weapons programme. In a letter to THE NATION published on November 19, he has given one sop to Pakistan but also has added a warning.

The sop is that there is time yet for the U.S. President to give the certificate (meaning there is time yet for Pakistan to earn it, if it wants to, by producing convincing evidence of nuclear abstinence). He recalls that after similar suspensions in some earlier years the certificate was given and aid was resumed as late as December.

The warning is that not merely suspected possession of the bomb but possession of its components alone can also trigger not only suspension but also permanent cessation of aid. Such a warning has not been noticed in the published exchanges between Pakistan and the U.S. on the occasion of earlier suspensions.

Even without this additional warning, there has been some speculation in India about what America's reasons could be for the extra firmness it is displaying this time. Is it because the evidence is more convincing now, or because the United States is now more willing to be convinced by it? Since India has believed for some years now that the available evidence is convincing enough, much more credence is given to the second explanation.

**New Dimension**

It is believed in New Delhi that the United States is much less dependent upon Pakistan in relation to the Gulf than it was in relation to Afghanistan, and Pakistan also is proving to be half-hearted in playing its role as a frontline state in relation to the Gulf, whereas it played the role with great zeal in relation to Afghanistan for ten long years. Therefore the United States has much less reason now for looking the other way, as it did hitherto while Pakistan went ahead with its programme, and not so surreptitiously either, of producing weapons grade nuclear fuel and collecting parts and equipment for making the bomb.

But be that as it may, a new dimension has certainly been added to South Asia's nuclear scenario by four facts coming so close upon each other's heels. First, the much greater seriousness visible in the suspension of American aid this time. Second, the incontrovertible evidence, on published American testimony that Pakistan has been trying to assemble the required components, including electronic triggers, highspeed cameras and special metals. Third, Mr. Oakley's warning over the penalty Pakistan might incur because of these efforts. If, in spite of the seriousness, the evidence and the warning, the United States resumes the aid, most Indians will conclude, including those in the policy making establishment, that it has again decided to look the other way for its own reasons, whatever these might be.

In other words, a certificate by Mr. Bush will convince India even less this time than it has done before that Pakistan's nuclear programme is entirely peaceful. The

Indian reaction will be that the United States would not have gone this far in pressuring Pakistan, and that too in the midst of the Gulf crisis, without some pretty solid evidence giving it cause for anxiety regarding Pakistan's nuclear intentions. Of course if the United States converts suspension into cessation, it will be seen as clear confirmation that the U.S. now fully shares India's long-standing conviction that Pakistan is not only at the nuclear threshold but has crossed it.

In either case one can expect to see powerful pressures exerted by public opinion upon the Government of India that it must respond to Pakistan in kind, that if India does not have a nuclear weapons programme yet, it must begin one now, and if India has a covert one it must be made public so that the right kind of message goes to Pakistan before that country launches some adventure in the expectation that it will catch India at a nuclear disadvantage.

The pressure will coincide with a phase in Indian politics when the decision-making apparatus in New Delhi is weaker and less sure of itself than at any time before, except during the short lived government of Charan Singh. Also, it will be mounted most by the one party, the BJP, which is currently at its maximum pressure mounting capability, in the first place, and in the second place is the most outspoken advocate of the bomb among all political parties in India. The Government of India might also decide, as it seems to have done in 1974, that some suitable nuclear demonstration might give it some relief from current political pressures.

This temptation will arise in India at the same time as an opposite temptation might arise in Pakistan: believing itself to be politically resurgent (which, I believe, it is not) and political authority in India being at its nadir, Pakistan might decide that this is the right time to try nuclear blackmail, just as it tried blackmail with conventional weapons in 1965, in the wake of Nehru's death.

### Chain Reaction

Because of this background one cannot rule out a chain reaction along the following lines: Pakistan takes nuclear diplomacy a step too far. In response, or in anticipation, India goes overtly nuclear, fortified in this decision by the belief that the U.S. would accept this as a legitimate response to a nuclear situation which the United States by suspending aid to Pakistan, has certified to be a challenging one for India. Or even without such fortification, India decides it has no option but to make this response. Pakistan then declares itself freed of the constraints which it claims to have observed in deference to America. It makes its own nuclear status overt in response to India's proclamation of its own status. India counter-reacts. The game escalates from qualitative status to the numbers of warheads that either side can boast of. South Asia gets caught in a nuclear arms race the fury of which is restrained only by the economic difficulties faced by both countries.

### Treaty and Trust

Of course, the race makes the difficulties still more serious as the entire industrially advanced world, including the Soviet Union, imposes penalties upon both countries, and some of them have a mandatory obligation to impose such penalties. India faces the added penalty that as it reorganises its defence structure around the new weapon, Sino-Indian relations revert to the verbal acrimony which marked them soon after China exploded its bomb in 1964 and India its device in 1974. Thus India loses the opportunity it has at present for a substantial improvement in its relation both with the United States and China.

Once the race begins it will be very difficult to curb it or its consequences. There is not much hope in the course suggested by some commentators that both India and Pakistan should go ahead and build their nuclear arsenals but also sign a bilateral treaty that neither will become the first to use its bomb against the other. The demand for such a treaty, whether raised within South Asia or pressed upon this region by outside powers, will only trigger an outcry against what will be denounced as another form of discrimination.

India has refused to sign the Non-proliferation Treaty on the ground that it discriminates in favour of countries which have gone ahead and have already acquired the bomb. Similarly the objection to such a treaty would be that it imposes conditions upon the new entrants which do not apply to older members of the nuclear club. A bigger problem is that such a treaty would require, for its success, a level of free standing mutual trust between the signatories which simply does not exist between India and Pakistan.

### First Token

And yet, in the given circumstances, it is only by mutual agreement, supported by other structures in addition to trust, that India and Pakistan can save each other from entering this higher dimension of an arms race which, once begun, will be as difficult to arrest as the 40-year-old conventional arms race, and will be far more dangerous, if not also more expensive.

As the first step, both countries should now sign the agreement which they have both accepted, not to attack each other's nuclear installations. To this end, and as the first token of trust, they should exchange lists of such installations. As a second step, they should discuss by what sort of measures of mutual inspection they can satisfy each other that neither will violate a purely bilateral treaty of nuclear abstinence. If by their bilateral efforts they are unable to devise mutually satisfactory inspection measures, they should invite into the process mutually acceptable third party expertise. At the least such an exploration would help each side test the other's sincerity, but it is more than possible that it will also produce satisfactory inspection arrangements, given the present inspection technologies, which are far more advanced than in the days when Indian commentators



used to dismiss the value of such inspections. The third step could then follow, of an actual treaty and its observance with such safeguards as might be considered necessary by both sides.

But before the first step forward can be taken by either side, it is necessary that India should at least abandon its position that it cannot agree to nuclear abstinence so long as China does not destroy its nuclear arsenal and join the abstainers club. It simply does not make sense any longer, though it might have once, for India to aim at catching up with the nuclear lead already built by China in every way—quantitative, qualitative, geographical, logistical. Much wiser would it be to concentrate thoughts on measures by which China's arsenal can be made less of a threat to the subcontinent.

#### **Analyst Writes on Galbraith 'MUSLIM' Interview**

91WD0326A Madras THE HINDU in English 4 Dec 90 p 9

[Article by K.K. Katyal]

[Text] New Delhi, 3 December—There are signs, faint though, of understanding in the United States of India's objections to the signing of the nuclear Non-Proliferation Treaty as also to a nuclear halt confined to the South Asian region.

New Delhi regards the NPT as discriminatory because of its weightage in favour of nuclear powers. It is opposed to regional nuclear disarmament because it does not take into account the totality of its threat perceptions.

In a recent interview to a Pakistani journalist, carried by daily MUSLIM, Mr Peter Galbraith, a senior staff consultant at the U.S. Senate Committee on Foreign Affairs, dealt with this point at some length.

Referring to the U.S. keenness on both India and Pakistan signing the NPT and agreeing to joint inspection of their nuclear installations, he said: "India has some objections to that which are related to China. China has nuclear weapons and it 'attacked India' in 1962. We could find some other way. Maybe, we can have a greater South Asian nuclear weapons free zone. I have proposed to keep nuclear weapons not only out of South Asia but also from China, or, maybe, out of the Indian Ocean.

Now India's turn: "Both the United States and the Soviet Union are drastically reducing the number of nuclear weapons. Hopefully we can bring the Chinese into the process, and maybe in the context of the general reduction in nuclear weapons, we can also find a formula that would give India some sort of security. India wants the superpowers should own great responsibility about the NPT because the NPT puts commitment on the superpowers to reduce nuclear weapons. [sentence as received] Now both the Soviet Union and the United States are doing the very thing that India liked us to do. We reduce our supply of the nuclear weapons. I think India is on the spot. Now it is for

India to show that it is prepared to cooperate in checking nuclear proliferation."

It'll be a tragedy for Pak: The consequences of a nuclear Pakistan were explained thus: "It will be a tragedy if the new Pakistan Government adopts a tough approach towards India. The two have to live in the same region. It is very important for them to cut down their military spendings. In 1965 Pakistan's literacy rate was 37 percent and today it stands at 25 percent. It is terrible.

In 1965 Pakistan's per capita income was the same as that of Korea. Today Korea is 10 times better than Pakistan. One reason is that Pakistan has simply ignored its people. It has ignored education and health care. It has ignored development activities. It has made huge spending on its armed forces. The result has been that Pakistan has ultimately become very weak.

#### **Shekhar Concerned Over Pakistan's Nuclear Program**

BK1812124990 Delhi Domestic Service in English 1230 GMT 18 Dec 90

[Text] The prime minister has expressed concern over Pakistan's nuclear program and hoped that Islamabad will not risk the terrible consequences that will necessarily follow a nuclear misadventure.

Addressing the parliamentary consultative committee of the Defense Ministry in New Delhi today, Mr. Chandra Shekhar said the government is fully aware of the developments in this regard. He assured the members that there need not be any apprehension in the minds of the people. The prime minister observed that with increasing understanding with neighbors and consequent lowering of tensions, there should be no cause for worry about the country's defense. However, the defense forces are fully alive to the ground realities and maintain effective preparedness at all times. He expressed the hope that the official and ministerial level discussions between India and Pakistan will further contribute to a better understanding of each other's point of view. He said the process has been set on motion with his recent talks with the Pakistan prime minister.

### **PAKISTAN**

#### **U.S. 'Blatant Discrimination' Policy Criticized**

BK2112120090 Lahore THE NATION in English 21 Dec 90 p 6

[Editorial: "'Accommodation' on Nuclear Issue?"]

[Text] It has been quite a while that someone in Washington remembered the "cooperative effort" and "sharing of vital interests" with Pakistan, albeit the occasion—White House ceremony for accepting the credentials of Pakistan's ambassador—had called for the usual exchange of diplomatic niceties. Nevertheless, President Bush appeared to have sounded a higher note of optimism about getting on with Pak-U.S. relations than signals hitherto emanating from Washington. Referring to the nuclear issue which he called the "foremost of the many challenges on our agenda" the U.S. President said "I sincerely hope that we can achieve an

accommodation." Mr Bush also made a reference to "regional nonproliferation" expressing good wishes for the progress of efforts for a "secure and stable South Asia free of nuclear arms" though, pronounced by him as the "ultimate goal" it obviously was not high on his agenda. Apart from the nuclear issue, Pakistan-India relations was another area which seemed to interest the U.S. President. And while welcoming resumption of contacts between the two countries, he reiterated Washington's offer of good offices to help formulate confidence-building measures.

The U.S. President talked about a number of issues ranging from the Gulf crisis to drug trafficking in Pakistan and also reaffirmed his commitment to remain Pakistan's partner in the "causes of democracy, free enterprise and peace". Nonetheless, his pious hopes of an accommodation on the nuclear issue notwithstanding, the Pak-U.S. relations will not take a turn for the better so long as his administration continues to pursue the policy of blatant discrimination against Pakistan. Accommodation, one imagines, implies "give and take" and the Americans are not being asked to give to Pakistan any new concessions. If they have chosen to arbitrarily give a new interpretation to the Pressler Amendment, it is for them to make amends for their misplaced belligerence. In so far as the question of peace and stability in South Asia is concerned, Pakistan is more than willing to live in peace with India, provided the price of normalisation does not entail mortgaging its sovereignty and national honour. Hopefully, Washington will give a higher priority to the creation of a nuclear-free South Asia than browbeating Pakistan for an endeavour vital for its economic progress and prosperity.

#### New Flexibility in U.S. Position Examined

91WP0056B Islamabad *THE MUSLIM in English*  
25 Dec 90 pp 1, 10

[Article by Khalid Akhtar: "N. Issue: Bush's Accommodation Offer—A Bait or Genuine Move"]

[Text] President Bush whilst accepting credentials of the new Pakistani ambassador expressed hope that Pakistan and the United States can achieve accommodation on the nuclear issue, which he called, "foremost of the many challenges in the two countries' bilateral agenda."

What does President Bush's statement signify? Does it signal a softening of the U.S. position on Pakistan nuclear programme? A categorical answer is premature and maybe unwise as well under the circumstance. However, a careful analysis of President Bush's statement gives one a feeling, that while reiterating the hardened U.S. position, though carefully couched in diplomatic jargons, and thus less provocative, President Bush has not slammed the door on Pakistan on the nuclear issue, and left the matter open to discussion.

President Bush's emphasis on 'accommodation' is significant as it implies flexibility in the U.S. position, notwithstanding its abhorrence to Pakistan's nuclear programme. As a matter of fact, it is for the first time that the U.S. has descended from its arrogant position of dictating terms to Pakistan and instead sought accommodation with the latter on the nuclear issue.

What could have promoted President George Bush to look and sound friendly. A minority view is, that the recent visit by U.S. Assistant Secretary of State for Defence Henry Rowen did not go all that unproductive from a U.S. perspective and that the 'White House Show' was a well planned move to make the 'climb down' for Pakistan on the nuclear issue less disgraceful and humiliating. In this respect the opening for inspection of (PINSTECH) Pakistan Institute of Nuclear Science and Technology is being viewed by some as a first step towards Pakistan's eventual surrender on the nuclear issue.

However, there are valid reasons to believe that the 'softening' in the U.S. position is due to some bold diplomacy on the part of Pakistan. Never before has a Government shown 'greater defiance' to the U.S. than the present one. U.S. Ambassador Robert B. Oakley, who was the most sought for diplomat during Ms Bhutto's regime, is now being kept at a distance by Nawaz Sharif government.

What, however, gave a jolt to the Americans was that Rowen's talks on the nuclear issue remained at the level of GHQ and the Foreign Office, and President Ishaq Khan and Prime Minister Nawaz Sharif, the two top men in the government, did not come into picture. This naturally downgraded the talks, much to the chagrin of the U.S. It would be significant to note that when Mr. Oakley flew into Islamabad with President Bush's aid cut message on the nuclear issue in the last week of August, he drove straight to the President House to deliver the U.S. 'ultimatum'. Things were to be different this time. If Mr Rowen had any message with him, it was not to be received or discussed at the President level.

Gen. Beg's 90-minute talks with Rowen have been viewed differently by different quarters. Some have interpreted it as the Brass's enhanced role in the country's politics after the dismissal of Ms. Bhutto's government on Aug. 6, with particular reference to such vital area as foreign affairs. (The nuclear issue since Zia's days has been GHQ's exclusive domain). Undoubtedly Mr. Rowen, to say the least, would have got a better perception and understanding of Pakistan's nuclear programme from Gen. Beg.

But, it was Gen. Beg's bold ex-position of the 'doctrine of defiance' in his address at a seminar in Wah, that seemed to have alarmed Washington. The General had conveyed the message loud and clear that the Brass, until now readily giving into the wishes and dictates of White House, was no longer in a mood to oblige its "friends."

President Bush's statement shows one thing, that the U.S. has got the message. His second signal is that the U.S. would like to avoid a head on collision on the issue, but rather resolve it by going for a 'step by step diplomacy', waiting for the right time to make its moves, and hoping for the best.

Rowen-Beg talks apparently did not provide a meeting ground for the two sides to advance their talks on the nuclear issue. It was way back in 1988 that the United States in a major shift in its policy agreed to view Pakistan's nuclear programme in the regional context, particularly vis-a-vis the Indian nuclear build-up. But since then the U.S. has backtracked from its position and is pressuring Islamabad to sign the NPT, irrespective of India signing it. Rowen in his talks in Islamabad, though reportedly accepted Pakistan's stand, but was never explicit on the 'regional' aspect of the issue as people here would have liked him to be.

There has been no comment so far from Islamabad on Bush's 'accommodation offer'. This shows that the authorities in Islamabad would like to move cautiously and would not be 'off-balanced' or 'carried away' by the diplomatic moves of its 'friend' and 'ally'. It will be a sheer naivete to think that the United States would accept Pakistan's nuclear programme, despite the former's acceptance of the nuclear stature of Israel, South Africa and India. This naturally makes Islamabad sceptical of Bush's 'accommodation offer'.

Accommodation implies giving concessions by the two sides. What adjustments Bush is prepared to make, or does he expect unilateral concessions from Islamabad. This makes one to think whether Bush's offer is a mere bait or a genuine move. Who has the final say in the matter will largely depend on Pakistan's ability to survive without U.S. crutches. There is a very close link between 'defiance' and 'self-reliance'—and that the nation cannot practise the former without acquiring the latter. It has not been easy for Islamabad to stay firm on the nuclear issue, but this is just the beginning of a long tussle. Islamabad must prepare itself for harder times and greater sacrifices.

#### **Oakley Urges Regional Nonproliferation Efforts**

91WP0056A Islamabad *THE MUSLIM* in English  
24 Dec 90 pp 1, 7

[Text] Islamabad, Dec. 23—Robert Oakley, American Ambassador to Pakistan, said here Sunday that Pakistan's nuclear programme should not be made a controversial issue between Pakistan and the United States and should be solved at regional level, says a Press release.

Oakley was talking to Senator Qazi Hussain Ahmed at his residence. He said if India had acquired nuclear capability, Pakistan, too had a right to do so for its defence. However, he stressed the need for easing tension in the region and said that both the countries should take effective steps to mitigate the hostile situation.

During the one-hour meeting the U.S. Ambassador expressed satisfaction over the Afghan Mujahideen leader Gulbadin Hekmatyar's agreement to the proposal of setting up an interim government in Afghanistan to hold fair and free elections. This interim government, without Najibullah and Zahir Shah, will be acceptable to him, the Ambassador assured.

Oakley said that the United States had no intention of stationing its troops permanently in Saudi Arabia and Gulf. The American troops have only been deployed there to get Iraq out of Kuwait, he explained.

Senator Qazi Hussain Ahmad said the deployment of American troops in the Gulf was not a solution to the crisis.

Qazi Hussain Ahmed urged the American Ambassador to use his government's influence to safeguard the Muslims of India from the atrocities of Hindus and to support Kashmiris' right of self-determination.

The American Ambassador in this regard assured him of his government's efforts.

Mr. Oakley called upon India and Pakistan to take effective steps for removing their bilateral differences and reducing prevailing tension in the region.

According to a press release issued by Jamaat-e-Islami, the U.S. Ambassador agreed that Pakistan has equal right to make all preparations to strengthen its defence in the face of Indian nuclear capability.

Referring to Pakistan's nuclear programme, he suggested that Soviet Union, China, India and Pakistan should make efforts to solve the issue of nuclear-non-proliferation at the regional level.

Mr. Oakley apprised Qazi Hussain Ahmad of U.S. efforts regarding support to Kashmiris in their struggle for achieving right of self-determination and of exercising its influence on Indian government for protecting the Muslims in India against the brutalities of Hindu extremists.—APP/PPI

#### **Oakley Cites Need To Avoid Controversy**

BK2412092390 Islamabad Domestic Service in Urdu  
0200 GMT 24 Dec 90

[Text] According to the ASSOCIATED PRESS OF PAKISTAN, U.S. Ambassador Robert Oakley has said Pakistan's nuclear program should not be made an issue of controversy between Pakistan and the United States. It should be solved at a regional level. Talking to Qazi Hussain Ahmad, amir of Jamaat-i-Islami, in Islamabad yesterday, Ambassador Oakley said if India had acquired nuclear capability, then Pakistan also had the right to do so for its own defense. [sentence as heard] He stressed the need, however, to reduce tension in the region and said both Pakistan and India should take effective steps to mitigate the hostile situation.



Qazi Hussain Ahmed asked the United States to use its influence to end atrocities perpetrated on the Indian Muslims by Hindus and support the Kashmiris' right to self-determination.

Later, on a meet the press program in Rawalpindi, the amir of Jamaat-i-Islami said that the Kashmiri people's struggle is soon destined for victory and asked India to review its policy and give the Kashmiris their right to self-determination.

### Prime Minister Affirms Nuclear Program Stand

BK1112170:90 Islamabad Domestic Service in English  
1600 GMT 11 Dec 90

[Excerpts] The prime minister, Mr. Nawaz Sharif reiterated that Pakistan will not compromise on its peaceful nuclear program, no matter what price it has to pay for that. He announced that our nuclear program is purely for peaceful purposes, but in any case, we will not accept any pressure whatsoever. Addressing a grand public meeting in Karachi this evening, the prime minister said they have been offering generous aid if we give assurance for not developing nuclear weapons, but Pakistan is determined not to take dictates from outside. He said Pakistan is a self-respecting nation and we want to live with honor and will never accept any aid at its cost.

Mr. Nawaz Sharif said a new era has ushered in and there will now be a rule of law and justice in the country. A beginning has been made to make the country self-reliant and with the help of the masses Pakistan will emerge as a strong and prosperous nation. He congratulated the people for the success of IJI [Islami Jamhoori Ittehad] in the elections and said the days of repression are over and the people are now breathing in an atmosphere of real freedom.

He called upon the opposition to accept their defeat in a graceful manner and cooperate with the government in reconstructing the country. The prime minister asked the people to practise austerity to face the economic difficulties and said our women folk have a significant role to play in living within means. In this context, he asked the people to curtail the use of pan [betel leaf] and tea on which the country has to spend a huge and precious foreign exchange every year. [passage omitted]

On the repatriation of stranded Pakistanis from Bangladesh, the prime minister announced that work was in progress and ishallah [god willing] the results will emerge soon. [passage omitted]

### Remarks on Nuclear Issue Welcomed

BK2512090690 Islamabad Domestic Service in English  
1600 GMT 24 Dec 90

[A.B.S. Jaffery commentary]

[Text] With the Gulf crisis now ominously inching toward what might be the flash point too terrifying to contemplate, it's quite clear that some other major issues may be left

simmering on the back burner. One such major issue is the new stalemate in relations between Pakistan and the United States over what the Bush administration perceives to be the rather warlike nature of this country's research and development in the field of nuclear activity. This particular issue has so far defied efforts sincerely made by both sides to sort it out to the satisfaction of both parties. One of the several sour side effects of this unresolved question has been the inability of the Bush government to ensure continuance of the contracted United States economic and military assistance to this country. The overall situation, however, is not as desperate as it might seem to less knowledgeable observers of the U.S.-Pakistan relations.

The notably significant and reassuring aspect of this want of full understanding of Pakistan's point of view on the part of the Government of the United States is that both sides have been making concerted endeavors to defuse the situation. During the recent past, moves have been made by Washington to discuss the matter at several levels in addition to the normal diplomatic channels. It cannot be without significant purpose that the United States ambassador in Islamabad should be making direct personal contacts with political figures with meaningful [words indistinct]. In the latest of such high enough level contacts, the United States envoy has struck a note or two which observers in the capital see as breathing in an air of freshness apart from being expressive of perhaps a greater measure of understanding of Pakistan's principled stand on its defense concerns in the peculiarly unpredictable and menacing military environment in the South Asian region. If anything, these deep concerns have grown even more profound with the deteriorating climate in the neighborhood as a result of the developing Gulf crisis.

In a recent meeting with a notable political leader and senator of Pakistan, the United States ambassador is reported to have expressed a measure of appreciation of Pakistan's insistence upon using a regional approach to dwell upon the question of nonproliferation of nuclear arms. Pakistan has maintained from the very beginning that the defense needs and concerns of a country cannot be properly evaluated in a vacuum. Pakistan's defense requirements have to be viewed in the context to the situation as obtaining in the region in which this country is located, and also in the perspective of the historical as well as geopolitical reality of the region. India is a nuclear power. One (?current) estimate says India has or is capable of putting together without much delay as many as 60 nuclear bombs.

It doesn't need much argument to convince any reasonable person or power that for Pakistan the knowledge that its archrival next door possesses such a formidable nuclear capability cannot but be a matter of most alarm and concern. This being the undeniable fact of Pakistan's situation, any insistence on the part of any genuine friend that this country should volunteer to commit itself to a nuclear impotence and also proclaim it is most extraordinary, that is to put it very mildly. Even so, succeeding governments in Pakistan have gone through the [word indistinct] lengths of promising to renounce all nuclear ambitions if neighboring India was persuaded to be likewise.

If current reports of the observations made by the United States ambassador in Islamabad during the past few days are anything to go by, there are some reasons to support the optimism that policy makers in Washington will be very well to see the obvious logic of Pakistan's plainly reasonable point of view on the nuclear issue. One report of the U.S. ambassador's recent comment is particularly welcome. He is reported to have suggested the nuclear question need not impede the development of friendship and cooperation between Washington and Islamabad. As far as Pakistan is concerned, that is exactly what this country has maintained all along. We are more than willing and happy to work out an equitable regional arrangement rendering all nuclear weapons and ambitions to acquire them as needless, irrational, obsolete, and that it is a threat not only to peace but also the prosperity of the region as a whole.

#### **Scientist Says Nuclear Energy Developed Indigenously**

BK0201112491 Karachi DAWN in English 2 Jan 91 p 4

[By our staff reporter]

[Excerpt] Karachi, Jan 1—Nuclear scientist Dr Abdul Qadeer Khan said on Tuesday Pakistan has emerged on

the world map with the development of nuclear energy for peaceful purposes.

He was delivering a memorial lecture on Major Abbasi Shaheed at the fifth annual symposium of Abbasi Shaheed Hospital here.

Dr Qadeer said despite vicious propaganda against Pakistan "we continued our modest efforts for making Kahuta plant a success." He said Pakistan was now among six or seven countries which had acquired nuclear technology for their development.

Dr Qadeer said the idea of Kahuta plant was conceived, developed, commissioned and operated by Pakistani scientists with their hard work and conviction without seeking any help from any foreign country.

He said the country had no scarcity of food, cotton and wheat. The need was to prevent the 30 per cent wastage of wheat and 25 per cent of cotton bales at ports and railway stations by irresponsible persons.

He said science has contributed a lot in the field of medicines communication, transport, energy, electronics, etc, which, if harnessed properly, could be of immense value. [passage omitted]

### **Cabinet Resolution on Nuclear Plants Issued**

*PM2901090991 Moscow PRAVDA in Russian  
26 Jan 91 Second Edition p 2*

[Unattributed report under the rubric "Official": "In the USSR Cabinet of Ministers"]

[Text] The USSR Cabinet of Ministers has adopted a resolution on measures to enhance the interest of local organs and the population in the siting of nuclear power projects on their territory.

The USSR Ministry of Atomic Power Engineering and Industry is entrusted, effective 1991, with including in the cost of constructing new AES's [nuclear power stations] and enlarging existing ones up to 10 percent of the capital investments allocated to this for the construction of projects in the social sphere inside 30-km zones around AES's (according to the lists, volumes, and times agreed with the corresponding local soviets).

Plans for the construction of new AES's and the enlargement of existing ones must provide for the construction of individual farmstead-type dwelling houses with heating, a central water supply, and sewer system for their workers in population centers located around AES's. Up to 10 percent of the funds earmarked for civilian housing construction are allocated for these purposes. Up to 20 percent of such houses will be transferred to local soviets.

It is also planned to include in the plans the construction of health camps for schoolchildren and preschoolchildren, based on providing all children living in a 10-km zone around an AES with passes, and to set up diagnostic centers attached to medical treatment establishments in AES settlements, where citizens living within the 30-km zone of AES's will be screened on referral by rayon health care departments in addition to the workers of these stations.

It has been decided, effective 1 January 1991, to grant the population living in 30-km zones around existing AES's a 50-percent discount on the set charge for using electricity for domestic needs (except rural consumers).

The USSR Ministry of Finance together with the USSR Ministry of Atomic Power Engineering and Industry is entrusted with drawing up proposals in the first half of 1991 for introducing compulsory state insurance covering the person and the movable and immovable property of citizens living around existing AES's against the risk of the effects of radiation, with compensation for those who have suffered possible harm occasioned by such effects.

For the purpose of funding the work to be done in regions where existing nuclear power generation projects are sited on constructing and modernizing health care, cultural, and public education projects and public consumer service and municipal service enterprises, as well as developing the material and technical base for the production of consumer goods during 1991-1995, the

profit tax liable to be entered in the Union budget is reduced by up to 30 percent for AES's.

The governments of Union republics which are divided into oblasts are recommended to leave at the disposal of kray and oblast soviets most of the tax on the operating profits of AES's located on their territory that is liable to be entered in the republic budget.

The USSR Ministry of Atomic Power Engineering and Industry has been charged with setting up automated information centers in all population centers located in the 30-km zones around existing AES's and other nuclear power generation projects during 1991-1995, so as to keep the population constantly informed about the radiation situation, and providing local sanitation services and the inhabitants of such zones with dosimetric and radiometric apparatus to monitor the radiation situation and the radioactive contamination of agricultural produce, as well as ensuring technical servicing and checking of this apparatus.

### **Official Criticizes Nuclear Plant Safety**

*91WP0052A Helsinki HUFVUDSTADSBLADET  
in Swedish 15 Dec 90 p 10*

[Article by Katarina Koivisto: "Leningrad's Nuclear Power Plant Still Not Safe"]

[Text] "If it were possible I would close the two older nuclear reactors in Leningrad. Even after extensive repairs they will not meet international safety standards. But the large-scale repair effort has increased the safety of the first reactor and we will shut down the second reactor in May for similar repairs."

These remarks were made by Artur Petrov, a representative of the Soviet nuclear safety authority, who visited the Radiation Safety Center in Helsinki and the nuclear power plant in Olkiluoto this week.

During the week Petrov also provided Finnish authorities with information concerning the remodeling work that has been carried out at the nuclear power plant in Leningrad.

"We have received answers to all our questions," said Antti Vuorinen, director general of the Radiation Safety Center. "But it is impossible to evaluate the extent to which the safety of the Leningrad nuclear power plant has improved solely on the basis of this information. A safety evaluation would require us to have our own people on the spot in Leningrad where they could do a thorough job."

In September Environmental Affairs Minister Kaj Barlund proposed that Finnish experts be prepared to visit Soviet nuclear power plants located near the Finnish border. According to Petrov Soviet authorities have no objection to such an inspection, on the contrary there are plans for a mutual Finnish-Soviet inspection in the fall.

For Finland at any rate it is a question of money. Inspecting the Leningrad nuclear power plant would require extra wage appropriations; how much depends on how thorough we want to be, according to Vuorinen. We are not talking about a quick assignment that can be carried out in a couple of weeks but a painstaking long-term effort.

At present there are four reactors in the Leningrad area, each with a capacity 1.5 times greater than that of the Lovisa reactors. A year and a half was spent improving the first and oldest reactor and it will start up again in January. The second will be closed in May for similar improvements. Both the older reactors are the same type as the one involved in the Chernobyl accident.

The two older Leningrad reactors will run at only 70 percent of capacity until the authorities are sure they are safe. Petrov assured us that the two newer reactors function well and they can be brought up to international safety standards with minor improvements.

"The Soviet Union has also reviewed its safety regulations for nuclear power plants and workers have been trained," Petrov said. "We have taken the consequences of the Chernobyl accident."

The Leningrad nuclear power plant is actually located in Sosnoviy Bor on the south coast of the Gulf of Finland, 85 kilometers west of the city. The Soviet authorities also store spent nuclear fuel in Sosnoviy Bor on a temporary basis. In the past, spent nuclear fuel from other parts of the Soviet Union was also brought there, but the local authorities have now banned this practice.

Petrov said there is a great need for a facility to treat the spent fuel and there are also plans for one in the Urals. But he did not feel storing the nuclear waste in Sosnoviy Bor represents any threat to the local environment at this time.

Petrov does not yet have any real responsibility for nuclear waste issues, but the Soviet authorities are reorganizing the nuclear safety administration and radiation safety and waste issues will now be combined with nuclear safety.

### **Urals Town Contaminated by Radioactive Waste**

*PM1401155391 Moscow IZVESTIYA in Russian  
11 Jan 91 Union Edition p 5*

[Report by A Tarasov: "Reportage with a Bias; Evacuation 40 Years Later"]

[Text] Sverdlovsk Oblast—A Sverdlovsk Oblast Soviet Executive Committee [oblispolkom] resolution has been approved. It provides for the evacuation of the inhabitants of the settlement of Ozernyy, Rezhevskiy Rayon, which is 70 km from the oblast center—it is yet another radiation disaster zone.

On my way to Ozernyy I took a look at the radiation monitoring report on homes in the settlement, drawn up

by a team sent out by the oblast sanitary and epidemiological station. Here are a few entries: "25 West Street—ceiling around 1,000 microroentgens per hour; 8 West Street—800 microroentgens per hour in the stove"....

I entered this little house, all neat and tidy:

"Lady, do you know that your stove gives off 120 microroentgens per hour and the part of the fence near your neighbors' gate is giving off around 400?"

"They came from the city and gave my mother a dosimeter. They told her to hang it on a nail. A month later they collected it. But there has been no sign of them since...."

In my conversations with the villagers I established that most of them were not only ignorant of the changes that lay in store for them, but had no inkling of the nature and scale of the problem in their own homes. And that was despite the fact that it had been Ozernyy's lot to have radiation as a "neighbor" for as many as four decades—ever since construction began on the uranium-thorium ore enrichment combine alongside the settlement.

...The Rezhevskiy uranium deposits turned out to be poor, so in 1964 the nuclear people left, leaving thousands of cubic meters of raw material in "burial grounds." It was only a token burial—sprinkled with earth. Sprinkled indeed—the protective layer was barely one meter deep. There were towering piles of sand-clay refuse on the bank of the Ozernaya River—production waste, its high level of radioactivity due to the residual uranium and thorium.

The nuclear people upped and left, without even giving the inhabitants of Ozernyy a hint of the implications of their legacy. The villagers set about removing the abandoned sand-clay refuse—anyone building a brick house, plastering walls, building a sandpit for grandchildren. Construction organizations took the pesky sand away in trucks and put it on all the highways in the neighborhood. The radiation spread in patches.

In the late sixties, the Sverdlovsk radio equipment plant, setting up a branch in the settlement, took over the empty premises of the former secret facility and the oblast sanitary and epidemiological station was allowed to monitor production.

"We appealed to the oblast leadership on several occasions," S. Treyger, a doctor at the oblast sanitary and epidemiological station radiation hygiene department, said. "But they merely made a note of our decontamination proposals."

Two years ago, some unsuspecting construction workers uncovered one of the "burial grounds" while laying heating pipes. Ozernyy had begun the final act of a tragedy without ever suspecting it: Everyone was suddenly renting cottages for the summer, students from the Urals University "Vagant" detachment were building



spacious brick houses in the settlement, and subsidiary farming was on the increase at the radio equipment plant.

V. Vyukova, head of the midwifery center: "Recently I collected analyses of all the settlement's inhabitants. I was hoping that doctors would require them. But no doctors have come. Except for a stomatologist, who only agreed to do a stint here."

Conversations with the villagers revealed that R. Khuzin, chief physician at the Rezhevskaya sanitary and epidemiological station, did visit Ozernyy on several occasions, but an amazing silence accompanied the visits... One inevitably wonders whether the settlement's plight is due not so much to the nuclear people's irresponsibility and not so much to the oblast authorities' diktat and local authorities' incompetence as to a basic lack of respect for the villagers, condemning them to neglect and ignorance. After all, if Ozernyy had been just once told the truth about the burial places and the villagers had been taught how to take elementary precautions against the invisible calamity, would they have allowed their kids to create a beach on top of one of the "burial grounds," near the river, where the gamma radiation was calculated at 3,000 microroentgens per hour? Had the doctors seen the analyses of the settlement's inhabitants, would they be dismissing some of them now, at the mere mention of evacuation?

Talk about moving and people reply: We would not be able to find work; we have cushy jobs here, salaries. But they also complain about not being able to lay on a decent meal and about sick children. The ultimate in the statization of human beings. To keep quiet about the fact that the settlement has been enveloped in something that is probably rather worse than a ring of radon clouds above the "burial grounds" is to make a mockery of things human: doctors maiming the sick through their inaction, the sick sacrificing their own salvation and their children for the sake of "salaries."

So they finally remembered Ozernyy. As if the 40 silent years had never happened and the tragedy had occurred overnight, the settlement suddenly—the only word to describe it—started getting visits from commissions, the Rezh Soviet adopted a resolution, immediately followed by the Sverdlovsk Oblispolkom. We might stop there. But one thing is worrying: Rezh and Sverdlovsk intend to help Ozernyy in different ways. For example, Rezh deputies, attracted by the possibility of rectifying matters at a chemical plant where, owing to conversion, there is a dire shortage of manpower, the Rezh deputies plan to construct 450 apartments and 25 cottages for the villagers. A Sverdlovsk Oblispolkom resolution talks only of 336 apartments in the rayon center—to all appearance, it will be implemented, nonetheless. A Rezh City Soviet decision envisages the construction of a kindergarten for children who have been moved out of Ozernyy, but this is not mentioned in the oblispolkom resolution.

There is no need to wonder why the Sverdlovsk people "forgot" about the kindergarten and 150 or so families of villagers. The reason is symptomatic. Judge for yourselves: The oblispolkom first calculated the cost of decontamination, involving the removal of radioactive waste from the settlement—and pretty expensive was the result. Evacuation, then. So they calculated what it would cost. Even more, apparently... A senior delegation went to Ozernyy, called a meeting of villagers, and tried to persuade them that there was no need to move.

What you have here is "market scales"—on one side the cost of the plans, on the other the value of the villagers' health.

The argument for those who stand behind the scales is that six-year-old Katya Kargina died in December in Ozernyy. Of leukemia.

...Just before I left I dropped in at the settlement soviet. I was closely followed by little Katyusha's mother, who had come to arrange for a death certificate for her daughter. I dared not approach her, so I went out onto the street. I was presented with a spectacle typical of the times: children from a boarding school for the mentally retarded—constructed on the grand scale in Ozernyy, with 150 places; incidentally there is no mention of its future in the oblispolkom resolution—were running in the direction of a "burial ground," all red faces, shouting something. They were running along a snow-covered road, through patches of radiation.

#### More on Chernobyl, Ignalina AES Incidents

PM1301153991 Moscow IZVESTIYA in Russian  
12 Jan 91 Union Edition p 7

[A. Pokrovskiy report: "Nuclear Power Station: From Smoke to Strike"]

[Text] At 0453 hours 10 January the output of the no. 3 power unit at the Chernobyl AES [nuclear electric power station] automatically dropped. The reason—the switching off of the electrical system protecting the motor of one of the main circulation pumps.

"At the same time," as A. Kontsevoy, leader of the Ministry of Atomic Power Engineering and Industry Main accident coordination administration [Glavnoye avariyno-dispatcherskoye upravleniye], told us, "the automatic fire-extinguishing system in one of the cable compartments was triggered. A commission is clarifying the cause of the incident." On the international scale of events, the incident at the AES is classified as a level 1 event (not a significant emergency).

A different but no less alarming report has come in from Ignalina. In response to the Lithuanian Government's attempt to sharply increase retail prices, the AES collective there has adopted a resolution, in addition to demanding that the price rises be rescinded, also makes political demands. According to information of the USSR State Committee for Safety in Industry and the

Atomic Power Industry [Gospromatomnadzor], the resolution proposes that contract prices be introduced for the electricity supplied to Lithuania as a measure for the social protection of the interests of the Ignalina AES collective. In addition, the station's collective warns that in the event of a new price hike not previously announced and the failure to adopt guaranteed compensation measures the Ignalina AES will be forced to call a strike. Then the supply of electricity on Lithuanian territory will be restricted...

[IZVESTIYA editorial footnote] According to a BALTFAX report, the Ignalina no. 1 power unit turbine ceased to operate 11 January.

### More on 1957 Chelyabinsk Nuclear Accident

914E0049A Moscow TRUD in Russian 24 Jan 91 p 3

[Report on the 1957 Chelyabinsk nuclear accident by I. Tsarev: "The Hostages of Secrecy"]

[Text] On a September morning in 1957, the courtyard of the Bauman Rayon enlistment office was filled with excited boys with shaved heads. The conscription was in progress. The music played and the military commissar made a solemn speech. Mothers, who came to see their sons off, were crying. None of them knew that this Moscow unit—which received the designation Number 360—was being sent towards a disaster....

Says V. Popov, now a senior engineer at the CPSU Central Committee publishing house "Pravda":

"The train brought us to the vicinity of Chelyabinsk and stopped at some unnamed platform. Then we were transported by trucks to the barracks, washed up in the baths, and received military uniforms... The weather was warm and calm. We were in an elevated mood. But the first day of service already held a surprise.

"I was looking with interest at the surrounding area through the barracks window. I saw a sports grounds, a wooden fence, and a yellowing wood grove... Suddenly a dark gray mound rose over the trees. The deafening thunder shattered the glass in the windows into small bits. I was thrown back into the corridor by a bouncy air wave. Then it was quiet again. Meanwhile black flakes that looked like pieces of burned paper started to fall on the barracks from the sky. We were catching them and examining them with curiosity....

"Then we were given dinner and loaded back into the trucks, together with the suitcases that contained our civilian clothes; this time the trip was quite long. To be honest, at that time I had no idea that I had become an unwitting witness to a very dangerous accident—a powerful blowout on one of the secret projects. Nor was I alarmed by the fact that the same day we were put

through a scrubbing in the baths again, while our suitcases with civilian clothes were being burned.

"The understanding came half a year later, when I began to suffer from lightheadedness, nausea, ringing in the ears, and a constant sensation of being hungry, as well as many other symptoms of radiation poisoning.

"As a result, I found myself in a military hospital in Sverdlovsk, where they ran some tests on me and... let me go. Ever since then, and up to this day, every once in a while the skin on my hands and feet cracks and then oozes blood, taking a long time to heal. I have a permanent peeling red spot on my chest. I suffer from muscle, liver, and back pain....

"Now I understand that, just like many other soldiers who served in that area, I had become a victim of the seal that says: "Secret." It is only recently that the world has learned about the existence of a mysterious city—Chelyabinsk-40—where work on the "nuclear safety shield" had been conducted. Only recently have we learned about a powerful accidental discharge at the nuclear waste site in 1957. As a result of this disaster, a large territory—known to the specialists under the code name of VURS, which means East-Urals Radioactive Trail—had been poisoned. The sad statistics of this zone, poisoned by the radioactive dirt, are still foggy.

"In those years, however, the incident was covered by an impenetrable curtain of secrecy. Nobody even mentioned potential contamination to us.

"I honestly served my term, did not goof off, went where my commander ordered me to go. Now I am 52. I am very ill. Therefore, I recently took a chance and wrote a letter to the USSR minister of defense, asking for early retirement pension as a Soviet Army invalid. In return, I got a variety of formal replies. I was informed that there was no discharge, that I could not be subject to that discharge because I was not still in the military service.... From the military unit in Chelyabinsk area I even got a letter saying 'You registered 23.54 Roentgen external radiation in May 1958,' although I had clearly stated that I happened to be near the nuclear discharge on the first day of my arrival, in September 1957....

"Most important, I still did not get any help. And the sad thing is that I am not alone in this. In 1957, tens of Muscovites from Unit 360 and other military people were in the area of nuclear catastrophe. I believe that the state has not taken care of them, either."

Alas, it is true that much has been forgotten, and sealed in secrecy for an extra measure of protection. Or perhaps Vladimir Pavlovich Popov exaggerated? But here in front of us is his medical history. There is a description of a bouquet of all kinds of ills; there is not a word, however, about the main source of his ills—radiation.

We found another participant of those old events of 1957.

Says B. Komarov, an artist who now works at OGONEK magazine:

"I also served near Chelyabinsk during the same year. On that particular day I was where Popov was. I felt the 'nuclear discharge' with my own body. I still have oozing sores that never heal. No, I have never appealed for any help because I figured that it was useless. What rights can I talk about if the accident itself did not even exist for many years? Only recently was it mentioned publicly. Independent experts and representatives of major U.S. nuclear defense centers visited the site.... But still nobody is talking about compensations for the people who suffered from this discharge. Have you been there? There is a cemetery there that makes your hair stand up: When you read the dates on the gravestones, you see that there are only young people buried there...."

The shroud of secrecy gradually slips off old events, sometimes revealing a frightening picture. Are there similar incidents that have been left "out of the picture" in locked and sealed safes? How many: one, two, ten? And who should help the people who have suffered from what had never happened? Today, when the events in Chelyabinsk-40 are no longer a secret, the conclusion is obvious: The USSR Ministry of Defense must reply in substance to V. Popov's inquiry. It is also obvious that this ministry and other related government departments must make an effort to locate former servicemen and civilians who were exposed to radiation, and provide the necessary help, late as it is. This should not be an act of charity—the state has an obligation to pay these people back what it has borrowed from them.

## CANADA

**AECL Sells Candu Power Plant Technology to South Korea***91WP0128A Ottawa THE OTTAWA CITIZEN  
in English 28 Dec 90 p A1*

[Article by Kristin Goff]

[Text] Atomic Energy of Canada has finally made a sale of its Candu nuclear power plant technology, its first in nearly a decade.

Energy Minister Jake Epp announced the \$600 million sale to South Korea Thursday. He called the deal a "vote of confidence" in Canada's nuclear technology that would provide 7,000 jobs over four years.

Of the total contract, about \$400 million will be spent in Canada, split evenly between AECL [Atomic Energy of Canada Limited] and private sector engineering and manufacturing companies. AECL will use Korean sub-contractors for the remaining work.

The sale is the second to South Korea, which currently has a Candu power station, Wolsong I, in operation. The new plant, Wolsong II, is to be built on an adjacent site, 420 km southeast of Seoul.

The sale of expertise, engineering and components represents roughly half the \$1.2 billion Koreans are expected to spend on the project, Epp said.

But the contract is strictly on a commercial basis, with no loan guarantees or other government subsidies, he said. It also comes at a crucial time for the beleaguered Crown corporation.

Earlier this year, Epp announced that AECL has seven years to turn its nuclear power operations around before it loses billions of dollars of public funding. About \$4 billion in public funding has gone to AECL to develop its nuclear power and nuclear medicine technologies so far.

Epp said Thursday the Candu sale to South Korea is an example of what he'd hoped for in the reorganization undertaken last spring.

The sale to South Korea may help pull Candu out of its sales slump, said Robert Ferchat, chairman of AECL.

"It does help. A track record of proving yourself around the world always helps," said Ferchat.

AECL last sold a Candu plant to Romania in 1981. Ferchat indicated South Korea, which bought its second Candu plant partly because it was impressed with how well the first one has performed, may well be a source of future sales.

The announcement brought renewed criticism from anti-nuclear forces who have lobbied for Canada to get out subsidizing nuclear power plant research and development.

"I don't think this is a happy day for Canada or for South Korea," said Norm Rubin, director of nuclear research for Energy Probe.

He said Candu reactors become inefficient once they get beyond 10 or 12 years old and create enormous environmental problems since there is no safe way to dispose high-level nuclear waste from the plants.

In addition, Rubin said Canada was increasing the risk of putting nuclear weapons into the hands of repressive governments because the Candu reactor is capable of producing plutonium 239, a key ingredient in nuclear weapons.

Epp dismissed the concerns, saying Korea was a member of international agreements prohibiting the spread of nuclear weapons and had an "exemplary record" in respect to its first Candu reactor.

He said while some environmentalists criticize the nuclear power industry for potential problems, conventional generating stations, which burn fossil fuels, add to the problem of global warming.

**Ontario Hydro Research Budget for Candu Reactor Cut***91WP0057A Ottawa THE OTTAWA CITIZEN  
in English 6 Dec 90 p H13*

[Text] Chalk River—A \$6 million Ontario Hydro program for advanced Candu reactor research at Chalk River Nuclear Laboratories was axed Monday.

The money will be redirected to other research projects at the lab as part of the provincial moratorium on the development of new nuclear power stations. The money was originally set for development of advanced Candu design concepts.

The program was part of a \$72-million-a-year, seven-year agreement signed last month between Ontario Hydro and Atomic Energy of Canada Ltd. [AECL] to provide money for nuclear research.

It is managed by the Candu Owners Group, an association of utilities with nuclear plants.

The change followed a provincial order to Ontario Hydro to renegotiate the deal to ensure the money is used for maintenance and improving safety at existing nuclear plants, said Ministry of Energy spokesman Peter Fraser.

Ontario Hydro spokesman Paul Burroughs said the money will be used instead for related nuclear research. He refused to provide details.

"It doesn't make sense to spend money on advanced nuclear Candu research when there's a question as to whether more Candus will be built."



Meanwhile, Atomic Energy spokesman Marcel Hebert is confident that research jobs at AECL are safe in the short term, but won't speculate on the long-term effects if the moratorium continues.

Deep River Mayor Lyall Smith fears that if the provincial moratorium on new nuclear power stations becomes permanent, jobs will be lost at the Chalk River labs, one of the area's largest employers.

A long-term freeze could affect as many as 2,000 lab employees, including scientists and engineers, who develop new technologies applied to Ontario Hydro nuclear stations, he said.

"These are delicate times and I do concern myself about the community," said Smith, an engineer at the lab.

#### **Ontario Hydro Signs Contracts for Tritium Sales**

91WP0058A Toronto THE TORONTO STAR  
in English 5 Dec 90 p A10

[Text] Ontario's NDP government is reviewing last year's controversial decision by the previous Liberal government to sell the radioactive gas tritium.

The review comes as it was revealed that Ontario Hydro signed contracts last month to supply two Ontario companies with 50 grams of tritium each for use in making luminescent signs. Both companies are controlled by foreign interests, one American, the other British.

Last year's decision was criticized by the New Democratic Party, then in opposition.

"We have sufficient concerns to undertake a complete review of the policy," said Anne Creighton, special assistant to Energy Minister Jenny Carter.

The government announcements in August 1989, said the tritium would be sold for peaceful purposes only. But peace activists argued against selling the gas which can be used to boost the explosive power of nuclear bombs.

Hydro has already delivered 5 grams of tritium to Shield Source Inc. of Peterborough, which is controlled by a Maryland-based company, said Ron Oberth, Hydro's manager of technology services.

The tritium would be sold to the companies at a price ranging between \$15,000 and \$30,000 a gram, Oberth said. The gas is produced at Hydro's Darlington plant on Lake Ontario near Oshawa.

### **FRANCE**

#### **Mitterrand Tells Israel Scuds Not French**

LD2001092991 Paris Domestic Service in French  
0630 GMT 20 Jan 91

[Text] Yesterday President Mitterrand made sure to personally phone Israeli President Herzog to assure him that France sold only conventional weapons to Iraq in

the past. Francois Mitterrand stressed that the Scud missiles that hit Israel twice are Soviet-made and not French.

#### **Iraqi Nuclear Capacity Said 'Nearly Destroyed'**

AU2501134491 Paris AFP in English 1327 GMT  
25 Jan 91

[Text] Paris, Jan 25 (AFP)—French military Chief of Staff Maurice Schmitt said on Friday that the allied air offensive had nearly destroyed Iraq's nuclear potential and had severely reduced its chemical warfare capabilities. Speaking to reporters, General Schmitt said that Iraq's "nuclear potential is practically destroyed and its chemical potential has been reduced by three-quarters."

"Iraq's capacity to arm Scud missiles with chemical warheads is not proven," he said, but added that it was "certain" that Iraq could deliver chemical weapons by means of aircraft or artillery. General Schmitt said that Iraq had fired 39 Scud missiles, and that of these, 32 had been destroyed, three had fallen on Israel (two before the deployment of U.S. Patriot missiles and one after) and four fell in the sea or in the desert.

He also indicated that Iraq's communication and anti-aircraft networks and oil refineries had been damaged.

He said that Iraq had obtained armaments from a number of Western countries, including pieces from Austria and mines from Italy, as well as warplanes from France. He said that all of the countries concerned had exchanged information on Iraqi military capacity.

#### **Iraq Possesses 30 Scud Launchers**

##### **Interview With Army Chief Schmitt**

AU1901151291 Paris AFP in English 1500 GMT  
19 Jan 91

[Text] Paris, Jan 19 (AFP)—Iraq still has an estimated 30 mobile Scud missile launchers, despite efforts by the U.S.-led coalition to find and destroy them, French military Chief of Staff Maurice Schmitt said on Saturday [19 January] in an interview with French radio.

General Schmitt warned that accurate figures were difficult to obtain, and said that Israel and Saudi Arabia would "perhaps" be hit by additional Scuds, but "the blow has to be absorbed."

He indicated that the missiles did not pose a great threat due to their inaccuracy and said that he did not believe that the Iraqis had succeeded in arming them with chemical warheads.

The chief of staff said that while Israel would be justified in defending itself, "Israeli leaders are aware of what is at stake and see the crude trap which Saddam Husayn is attempting to set for them."

Gen. Schmitt predicted that the Israeli leadership would "adapt its reaction, and might even decide to do nothing.

He estimated that the conflict might last for two or three months.

Earlier, a senior French military official said that warplanes from the anti-Iraqi coalition had bombed 10 out of 40 Iraqi mobile Scud-B missile launchers on Thursday and early Friday, leaving 30 untouched when air raids resumed Friday afternoon.

He said that most of Iraq's fixed missile sites and storage facilities had also been attacked.

Before the outbreak of the Gulf war, Iraq possessed some 800 Soviet-built Scud-B missiles based at 50 fixed launch sites and on 40 mobile launchers, the French official said. He added that an estimated one quarter of them were upgraded Al-Hussein and Al-Abbas versions of the original Soviet product.

The mobile launchers are extremely difficult to localize for satellites and reconnaissance planes because they are capable of traveling at 70 kilometers (45 miles) an hour on roadways, and can move to their launching site, release their missiles and relocate to shelters before they are hit by opposition counter strikes.

Forty of the 50 fixed sites were operational several days before the coalition offensive, and 30 additional sites were under construction but were not finished when hostilities began, the official said.

The Scud-B is a relatively primitive missile, with a maximum range of 280 kilometers (175 miles) and is accurate to within 400 meters (440 yards).

The modified Al-Hussein has a range of 600 kilometers (370 miles) and is accurate to within only 2,000 meters (2,200 yards), according to reliable Western sources, while the Al-Abbas can travel 900 kilometers (560 miles) and is accurate to within 3,000 meters (3,300 yards).

#### Comments on Missile Use

*LD1901180591 Paris Domestic Service in French  
1700 GMT 19 Jan 91*

[Text] Is Israel still threatened by Scud missiles? Is Iraq still in possession of Scud missiles? Yes, says the chief of staff of the French Army. According to General Schmitt, the Iraqis are still in possession of 30 operational missiles. But do these missiles pose a serious threat to Israel?

[Begin Schmitt recording] As far as I am concerned, I do not think that these Scuds with explosive heads constitute a considerable threat. Of course, one should try to get rid of them, as some Scuds might still fall either on Israel or Saudi Arabia. I think one should know how to receive them. One should be aware that it is something that cannot modify the potential. I do not think the Iraqis did that. In fact, they have never used Scuds with chemical warheads. I refer to facts. We think that there

are about 30 remaining mobile launchers in Iraq. At the military level, I tell you that the conflict has absolutely not changed its nature. It is not a few Scuds or a few wounded—whatever their wounds are—that can change the nature of a conflict. [end recording]

The general also thinks that the conflict could last two or three months. It is a reasonable hypothesis, he said. On the other hand, the chief of staff of the French Army does not brush aside the possibility of France intervening in Iraq. We recall that France, since the start of the conflict, has limited its attacks to Kuwaiti territory.

#### Plant Closed for Safety Violations

*91WP0055A Paris LE MONDE in French 16-17 Dec 90  
p 8*

[Article by Jean-Paul Dufour: "For the First Time in France: Nuclear Plant Closed for Violations of Safety Regulations"]

[Text] The ministers of industry and environment have decided to set an example by inflicting the maximum penalty for violations of nuclear safety regulations. As of Thursday, 13 December, they suspended the operating permit of the Ionizing Radiation Office (ORIS), an Atomic Energy Commission (CEA) subsidiary that manufactures radioactive sources for industry and medical use. ORIS will not be able to resume its activities until it gets a green light from the two ministers.

This is the first time that this "absolute" weapon has been used in France. The current stir over nuclear problems following the incidents involving the CEA's storage of waste in Saint-Aubain and Le Bouchet and the recent publication of two parliamentary reports no doubt have something to do with this severe response. It must, however, be said that ORIS' violation was not a minor one since plant officials clearly ignored the orders of the Central Service for Nuclear Plant Safety (SCSIN).

ORIS had, in accordance with regulations, requested authorization from SCSIN before importing a large amount of cesium chloride from the United States that was to be used in the manufacture of radioactive sources. As a prerequisite to any authorization, SCSIN required that a report be submitted describing the technical measures to be employed to prevent the cesium chloride, which is highly soluble in water, from spreading into the storage pool in the event the protective "cask" should fall and rupture during handling. But when, last 7 December, SCSIN inspectors went to the plant to verify that the arrangements described in the report that ORIS had just submitted had actually been made, they confirmed the fact that three casks containing 50,000 curies of cesium chloride had already been discharged into and stored in the pool!

"Of course, there was no incident. But these people had refused to play the game by the rules," a SCSIN official protested. "It's a little as though a driver, even a good one, were to take the wheel without a license." CEA

management, which has launched an internal campaign for openness and safety following the public unrest of these past few weeks, is not mistaken about the gravity of this violation.

All the more so since ORIS, already "tagged" in the past for negligence with regard to safety (LE MONDE 9 December 1989), is located at Saclay (Essonne), under the jurisdiction of which the waste storage facility of Saint-Aubain also falls. Alerted a few days before the decision by the two ministers, CEA general administrator Philippe Rouvillois assigned an investigating mission to shed some light on this new incident. This was to lead the CEA to step up the reform of the radiation safety departments of its nuclear centers instituted following the controversy over Le Bouchet and Saint-Aubain.

## GERMANY

### U.S. List of Companies Supplying Iraq Reported

AU1401100291 Hamburg DER SPIEGEL in German  
14 Jan 91 pp 16-17

[Unattributed report: "Baker's Black List"]

[Text] During his visit to Bonn last week, U.S. Secretary of State James Baker renewed U.S. accusations that German companies continue to break the trade embargo against Iraq. Over the past few months, U.S., British, and Australian intelligence services have supplied 100 clues about German sinners. On a blacklist drawn up by the Americans, which lists more than 550 companies from 50 countries, Germany occupies second place, immediately after Iraq's neighbor Jordan. Baker refers to generally excellent information provided by the National Security Agency, the most secret of all U.S. intelligence services, which constantly records any telecommunication with Iraq all over the world and also monitors suspicious companies in Germany.

Specifically, the Americans accuse the Hesse company Karl Kolb, which is considered to have built a poison-gas factory in Iraq, and Rhine-Bavaria Vehicle Construction in Kaufbeuren, which is supposed to have delivered equipment for mobile poison laboratories to Iraq. As late as November 1990, according to information that the Tafesan firm of Hannover provided itself, the company wanted to ship medical equipment to Baghdad's Health Ministry, which is closely cooperating with the Defense Ministry. According to the Federal Intelligence Service, the company has previously delivered laboratory equipment to the Iraqi Nuclear Energy Agency.

The branch offices of the Japanese multinational concern Minolta in Langenhagen near Hannover and in Ahrensburg near Hamburg are suspected by the Americans of having planned deliveries of so-called optronic [optronisch] instruments, which are used in missile construction, as late as October 1990. In November customs investigators sealed rooms there and seized material.

### Technology Used To Build Iraq's Scud Missiles

LD2601093491 Berlin ADN in German 0232 GMT  
26 Jan 91

[Text] Hamburg (ADN)—Numerous German firms have played a part in developing the Iraqi version of the Scud-B missile, according to a report in the latest edition of the Hamburg-based news magazine DER SPIEGEL. Among them is the Thyssen Company in Duisburg. Inquiries are being carried out into its subsidiary Thyssen Industrie, because it is said to have delivered pumps for the missile's propulsion.

The Hamburg-based manufacturer of navigation equipment, Plath, against whom inquiries are also being carried out, constructed guidance equipment for the Scud. An inquiry is also in progress against the Hesse trading firm of Tramac because of its role as a middleman in missile deals.

One of the main suppliers for the further development of the Scud-B, as the magazine goes on to report, was the Hesse consultancy firm of Havert. During a search of the company's premises in mid-January, investigators found comprehensive material on collaboration with Iraq on missile technology.

During the search the investigators also came across documents on the Scud-B from the GDR's former National People's Army. Confiscated blueprints give rise to the suspicion that weapons for Iraq were being copied in the former GDR. In any event, GDR technicians helped in the conversion of the missile at al-Fallujah [about 20 miles northwest of Baghdad].

According to the magazine, there is a danger that Iraq will use 120-mm poison gas shells and 122.4-mm short-range missiles filled with nerve gas during ground combat. The shells were filled in the Samarra poison gas complex, built by German firms. German firms also supplied the filling equipment. Inspection equipment was even built in Samarra for sealing the shells and missiles, thereby preventing the possibility of the gas leaking out.

Nevertheless, in the view of experts, it is improbable that Iraq could use poison gas in its Scud attacks on Israel. They believe there is no equipment suitable for loading the missiles in Samarra, the only location in Iraq for loading poison gas.

### Companies Said To Sell Iraq Poison Gas Casings

AU2201105091 Hamburg DER SPIEGEL in German  
21 Jan 91 p 17

[Unattributed report: "Iraq Investigations"]

[Text] According to information supplied by U.S. intelligence services, German investigators have opened investigations against two important arms suppliers to Saddam Husayn. Under file number 2 Js 469/90, the Duisburg state prosecutor has opened investigations

because of suspected infringement of the arms export law. Businessman Klaus Tellkamp of Muelheim, who has official residences in Nice and in South Africa, is said to have supplied 1,500 210 mm caliber shell casings for poison gas to Iraq. Iraqi arms companies such as the Hutteen State Establishment and the State Organization for Technical Industries also ordered from Tellkamp another 1,500 such casings. However, this deal obviously failed to materialize before and also after the embargo. According to the investigators' information, Tellkamp is said to have used a South African firm in order to cover up the deal with Iraq. The shells were intended for the Al-Fao gun, which Gerald Bull, the artillery genius who was killed in 1990, designed for Saddam Husayn. In a second case the investigators have gotten on the track of an Iraqi arms deal, which after the initial study of 250 files, is of enormous dimensions. For many years the Neu-Isenburg companies Havert Industrie Handelsgesellschaft mbH and Havert Consult Project Engineering and Consulting GmbH carried out transactions worth millions [currency not given] with almost all important arms suppliers. Among other things, Havert is said to have supplied bomb hangers [Bombenhaenger] for aircraft and control devices [Steuerteile] for the "missile project 1,728" (Scud-B-improvement). Because of alleged violation of the foreign trade law and the arms export law, preliminary investigations have been opened against manager Gerhard Paul and company consultant Hesse-Camozzi. Last week's visit by the investigators was obviously expected. An employee received them by asking why they were coming so late since they had been expected earlier.

#### **Firms Made Arrangements With Iraqis for Hostages**

*LD1601101491 Berlin ADN in German 0851 GMT  
16 Jan 91*

[Text] Hamburg (ADN)—Many German hostages working on projects in Iraq were only released because of arrangements between their companies and Iraq, and not as a result of political efforts, the Hamburg news magazine STERN reports in its edition to be published Thursday.

According to witnesses, one-third of the hostages who left Baghdad with Willy Brandt, honorary chairman of the Social Democratic Party, already had their exit documents. The Foreign Ministry confirmed to STERN that every member of a company wanting to leave Iraq needed a so-called "letter of support" from the Iraqi business partner. Former hostages say that those documents were only issued if the foreign company gave a completion guarantee. In order to be able to continue work on their projects after the sanctions were imposed, staff members of German firms hid important electronic elements and computer software in their luggage and smuggled them into Baghdad via Jordan.

The "Thyssen Rheinstahl" company had, through the Foreign Ministry, sent a coded telegram to Baghdad

asking the director of the Iraqi arms concern "Nasir State Enterprise," Alami, for talks in Tunis. Thyssen chief Herbert Brenke told STERN he wanted to negotiate with the Iraqis because they were demanding the "delivery of a chemical reactor substance" in return for the release of his people. However, the meeting in Tunis never took place. Contrary to this the former Thyssen trade representative in Baghdad, Christian Weide, told STERN the meeting was "to negotiate the delivery of a steel hyperpress [stahl-hyperpresse] needed by Iraq for the construction of its supergun." In the end Brenke went to Baghdad and achieved the release of his people.

#### **Firm Denies Helping Iraq Develop Nuclear Bomb**

##### **Company Statement**

*LD2112125190 Hamburg DPA in German 1054 GMT  
21 Dec 90*

[Excerpt] Bergisch Gladbach (DPA)—Interatom, in Bergisch Gladbach, today denied as "utterly false and without foundation" a SPIEGEL report that the company was suspected of having helped Iraq to develop the atom bomb. "We never supplied anything or trained anyone in the field of nuclear technology," the spokesman of the Siemens subsidiary, Hartmut Mayer, said in response to an inquiry. He said Interatom started to construct a workshop near Baghdad for processing pipes but stopped the work due to the embargo against Iraq. Mayer said the planned supply of machinery for the building, which the Iraqis said was for production in the petrochemical, pharmaceutical, and food sectors, had not taken place because the Federal Economics Ministry in Bonn expressed misgivings. Without giving details, the ministry quoted "secret service reports" as the cause of these misgivings. [passage omitted]

##### **Spokesman Supports Firm**

*LD2112132990 Hamburg DPA in German 1210 GMT  
21 Dec 90*

[Text] Bonn (DPA)—Government Spokesman Dieter Vogel today confirmed the Interatom statement that the contract was broken off after the intervention of Bonn ministries. There was also no evidence that goods requiring approval were supplied. The spokesman of the Bonn Economics Ministry, Volker Franzen, said Interatom's contract was a "training contract," which, prior to the invasion of Kuwait, was classified as "in no way sensitive." After the training was halted, "important parts" for a training workshop were also not supplied.

The spokesman also said that the Economics Ministry was checking a U.S. list of names of German firms said to have had contacts with Iraq. The United States tapped telephone and telex traffic in the Middle East, but so far no infringements of the embargo against Iraq were discovered.

Meanwhile, Siemens confirmed that Interatom signed a contract with the Iraqi firm Industrial Projects Company



(IPC) in the summer of 1989. It was only in April 1990 that Siemens was informed by a Bonn circular that IPC was also active in procuring arms and nuclear technology. Siemens approached Interatom because it was the company with central responsibility for the reconstruction of Iraqi industry. The Siemens/Interatom contract was a "normal infrastructure project" like those being carried out in many other Third World countries.

### Details of Nuclear Deals With Iraq Exposed

AU2712081190 Hamburg DER SPIEGEL in German  
24 Dec 90 pp 69-72

[Unattributed report: "Nuclear Help for Saddam Husayn?"]

[Text] Saddam Husayn's purchasers preferred to buy in Germany—and only in the best shops. Investigations by DER SPIEGEL have discovered that Siemens subsidiary, Interatom, has had good contacts with the Iraqis. The enterprise helped with the development of nuclear technology and trained Iraqi personnel.

The name Ali Abdul Mutalib Ali [as published] is well known in the international arms business. For almost a decade, this Iraqi citizen has purchased important war materiel for Saddam Husayn.

As economic attache, Ali was stationed in Bonn until 1987. He developed the Iraqi Embassy on the Rhine into an important center for the acquisition of murderous hardware. His office was a meeting place for arms dealers and managers of large arms companies alike.

From his branch office at Duerenstrasse, together with Saddam's people in London, Ali coordinated the shopping sprees on the European market. In many documents seized by the investigators, the name of Mr. Ali A. Ali appears again and again. Western intelligence services are on his trail and the Cologne-based Customs Criminal Institute has been warned about him.

For a certain time the smart Iraqi has been entrusted with a special duty. With the help of the Baghdad arms firm Industrial Projects Company (IPC), he is alleged to have promoted Saddam Husayn's nuclear program.

Formally, IPC is part of the Industry Ministry, yet the management is under control of Husayn Karmil, the dictator's son-in-law. From the War Ministry, he organizes all armament procurement. Products made in Germany are in particularly great demand.

On 8 April 1989, Karmil's Ali, together with three experts—all three of them graduated scientists—visited the center of the German nuclear company Interatom in Bergisch Gladbach. Internationally, the Siemens subsidiary is regarded as the leading company in the field of nuclear technology. Interatom builds reactors and specializes in enrichment technology involving uranium, which is what Baghdad was most interested in. Iraq's

nuclear company IPC opted for the German nuclear company over many other competitors.

In the summer of 1989, the negotiators of both sides reached an agreement. According to the official version, Interatom declared itself ready to help Iraq in the area of the construction of industrial pipelines—by supplying machinery, know-how, and a special training program.

Although this sounds harmless it is in reality a highly delicate matter. Experts suspect that the Siemens company provided important assistance to Saddam Husayn's regime in the area of nuclear technology. Nuclear engineers from Iraq are said to have received expert knowledge, particularly in the area of uranium enrichment.

After the deal with IPC, Interatom was intended to supply, as a general contractor, highly sophisticated machinery and equipment such as helium leak detectors and vacuum pumps. The Iraqi engineers, who were trained in Bergisch Gladbach, were to be given the opportunity to carry out independent tests with these devices.

Only months after the agreement was concluded, Bonn found out about this deal and reacted with great irritation. The Foreign Ministry and the Economics Ministry agreed to hold a crisis meeting. The management of Interatom was summoned to Bonn and was requested to halt any "such activities." In a confidential telex, the Foreign Ministry warned that these activities might lead to "political complications."

Even before this, Genscher's office briefed the other ministries via telex about the sensitive character of such deals. "The mere suspicion of the involvement of German companies in an Iraqi nuclear arms program" was enough to do "considerable damage" to the FRG "in the area of foreign policy."

It is now known that this warning was well founded. For many months, since the day when Saddam Husayn's troops invaded Kuwait, there has been growing criticism in the United States of German arms deals with Iraq.

"Our boys in the Gulf," an angry U.S. senator recently stated, "must first fight their way through German poison gas fumes so that they can then destroy the German nuclear power plants."

Saddam Husayn's nuclear program is based on centrifugal technology, a speciality of German engineering. In the early eighties, Pakistan illegally received this technology from German firms.

In the summer, Economics Minister Helmut Haussmann said to a small group of people that "certain components and even some system parts" of the Iraqi gas ultracentrifuge showed "construction features characteristic of the various German gas ultracentrifuges."

The centrifuges are produced on flow turn machines; three such machines were supplied to Baghdad by the H

and H Metalform company of Drensteinfurt in Muensterland. The Iraqis hold a 50-percent share in this company.

Former MAN Technology engineers Walter Busse and Bruno Stemmler, two specialists in centrifuges, worked as technological advisers to Iraq in the eighties. They have a lot of expert knowledge since their former employer set up an assembly plant for centrifuges in the city of Gronau in Westphalia in 1979.

The Americans and the Israelis follow with particular distrust the activities of German business people in Iraq. Recently, the CIA reported that less than two weeks earlier, people from MAN and the Bielefeld-based Gildemeister Projecta GmbH company, the builders of the largest Iraqi military research center, traveled to Baghdad via Jordan.

According to findings of the Federal Intelligence Service, Iraq was also supplied with German nuclear technology via Brazil. In the summer, the Foreign Ministry stated that "everything was to be done" to prevent "supplies" from German companies—such as MAN Technology and Interatom—from reaching Iraq; that is, supplies which could possibly be used for the Iraqi nuclear arms program.

Together with Steag of Essen, Interatom exported a separation nozzle plant for uranium enrichment to Brazil. It is to be put into operation in the middle of 1992. Interatom has argued that since the nozzle process differs fundamentally from enrichment on the basis of centrifuges, it is impossible that Brazil illegally passed on know-how to Iraq.

It is true that the nozzle project is the enrichment procedure that requires the most sophisticated technology. Nevertheless, several components are interchangeable.

In a classified paper, the FRG Finance Ministry has stated that via direct or indirect channels, "since the middle of 1988 at the latest," Iraq has been trying "to get components and technology for uranium enrichment" also from the FRG. Control agencies and companies have for a long time been familiar with the names of the enterprises and persons that have helped Iraq to get what it needs.

For example, the Iraqi arms company Al Qaqa State Establishment has worked on the development of non-nuclear components for nuclear weapons. The Nassr State Enterprise is part of the procurement network as is the Al Arabi Trading Corporation with manager Faruk Taha, or the Lahib Nari Import-Export Corporation.

It is no secret that IPC played the leading role in all nuclear projects: It may be that high-quality steel, which is particularly suitable for nuclear technology, is bought from the Ticino steel company Schmiedemeccanica, or

that special magnets are bought from the Inwako company, a supplier to Iraq, or that Iraqis are trained by the British Magntech company—the IPC is always acting as the client.

It has been clear for quite some time that several dozen IPC suppliers in Europe knew exactly with whom they had to deal, even though a few might have been deceived by the buyers. Still, it is hardly conceivable that managers who are so familiar with international business, such as those from Bergisch Gladbach, can be as naive as Interatom pretends it is even today.

Two weeks ago, Hartmut Mayer, a manager of Interatom, emphasized to DER SPIEGEL: "We had neither information nor hints, at the time the orders were discussed or later, that Iraq was making efforts to become active in the area of uranium enrichment."

He then continued: "Now as then, we know nothing of a former economic attache to Bonn by the name of Ali Abd-al-Ali." Moreover, IPC only presented itself as an enterprise the main job of which was "the reconstruction of the Iraqi industry."

Interatom should know better. For years the company has had a branch in Baghdad. Its chief, Friedhelm Hendrian, knows many official government representatives; he obviously feels so much at home in Iraq that he did not want to leave the country aboard the aircraft Willy Brandt that was hired to fly out the hostages.

Nevertheless, the Interatom people have said through a leaflet circulated by the FRG Finance Ministry, that on 23 April 1990 it had learned "for the first time" that IPC was involved "in Iraq's procurement activities for the military use of nuclear technology."

According to the law, Interatom applied for a license for the Iraqi project at the Federal Economics Office in Eschborn. Johannes Pfirschke, who was responsible for examining this case, stated on 5 October 1989 that his office had no objection to the training of 22 IPC engineers and experts.

This was too much for Professor Pfirschke, who had been transferred to Eschborn from the Armed Forces Office in Bonn only shortly before. The former official responsible for military affairs is an expert on nerve gases, but not on nuclear energy.

Only officers from the Supreme Fiscal Authority of Cologne noticed certain inconsistencies when they checked Interatom books in the middle of April 1990. For example, they noted that after Eschborn gave the go-ahead for its projects, Interatom changed the program.

According to an FRG Economics Ministry paper, "the final version" was agreed upon with IPC only on the 43d calendar week, which is three weeks after the program was approved.

Officially, it dealt with "generally accessible engineering knowledge for the laying, construction, processing, and examining of pipeline systems" (Interatom). The examiners grew suspicious when they learned that the group of trainers included "know-how experts" from the areas of "uranium enrichment plants" and "advanced reactors and energy systems—plant operation."

What is also strange is that an alleged training program for the construction of pipelines met with massive resistance even within Interatom. A leading manager from the uranium enrichment department refused to hold classes for the Iraqis. According to a notice of 24 November 1989, he had "fundamental reservations" because of his obligation to secrecy.

Obviously in order to protect itself, the company management issued an internal message that banned passing on expert knowledge from the field of nuclear technology to the Iraqis. At the same time, however, Interatom managers considered it a good idea to provide their Middle East clients with nuclear literature, such as the "Handbook of Hydraulics," published by the U.S. National Nuclear Energy Commission.

According to a note by the project management, the Arabs seemed to be particularly interested in "practical work" with the Siemens computer system Telperm M.

The highly sensitive Siemens control plant is most useful for the fine-tuning of complicated military plants. According to findings of Western intelligence service experts, a Telperm M system is in operation in the Indian city of Hazira. There it controls a heavy water plant for several nuclear reactors.

Another "Telperm M plant has been installed in Libya—in the poison gas plant of al-Rabitah. Disguised as a "gauging and control device for the automation of a chemical plant," it was supplied to Libya by two small firms from southern Germany.

After examining the documents, the suspicion of the experts from Bonn was aroused when they learned that the Iraqis showed a particularly great interest in information on "desublimation at freezing temperatures," a process that is particularly important for the enrichment of uranium.

In the centrifugal process this term describes the transformation of uranium hexafluoride (UF<sub>6</sub>) from a gaseous state to a solid one. The UF<sub>6</sub> gas is fed into a centrifuge where it is picked up by the rotor. This process separates Uranium 235, which is essential for the construction of nuclear bombs. Subsequently, the UF<sub>6</sub> gas is collected in deep-frozen receptors, so-called desublimators, at a temperature of minus 70 degrees.

The Iraqis cannot, however, have collected a lot of this substance to date. To obtain the material necessary for a single bomb, a cascade of about 1,000 gas centrifuges must be operated an entire year without interruption.

This is why experts do not regard as very plausible the most recent warnings by the Americans of a nuclear bomb in the hands of the dictator. According to the Vienna International Atomic Energy Agency, Saddam Husayn has neither put aside fissile material from an old supply of highly-enriched uranium, nor does he have enough centrifuges.

According to serious evaluations, Baghdad currently has about two dozen centrifuges. This means that the production of a single bomb would take some eight to ten years. Also, assistance by Western experts will be increasingly difficult to obtain.

Meanwhile, Bonn has withdrawn the license for Interatom's IPC program. The supplying of a testing center, which was estimated at 15 million marks in the first stage alone, and the second part of the training program were stopped. Sources in the Foreign Ministry have stated that "as a consequence of most recent information .... it is no longer able to give its approval."

Even the federal office of Eschborn, which is headed by President Hans Rummer, a man who is on friendly terms with the industry, was not able "to maintain the confirmation of its broad approval." The office has now stated to DER SPIEGEL that in the course of an "examination of foreign trade procedures doubts have emerged" as to whether the training of the Iraqis at Interatom went beyond the questionable level.

Under Section 45 of the Foreign Trade Law, such knowledge must be imparted only with express approval. Nevertheless, the managers of the Siemens subsidiary do not have to fear any consequences under criminal law.

Quite the contrary, the FRG Government has now taken measures to protect itself against any legal countermeasures by the nuclear firm. The Economics and Foreign Ministries have asked the managers at Bergisch Gladbach to guarantee that Interatom will not seek either a court examination or claims for damages as a result of withdrawing from Iraq.

## ITALY

### Problems Seen in Dismantling Plants

91WP0043A Milan EUROPEO in Italian 23 Nov 90  
pp 112-119

[Article by Fabrizio Filosa: "Four Atomic Bombs"—first paragraph is EUROPEO introduction]

[Text] How can we dispose of the nuclear power plants that have outlived their usefulness? Caorso, Trino, Garigliano, and Latina: These deactivated plants are a nightmare for the technicians who must dismantle them. No one yet knows how to do it or how much it will cost.

Will these four gigantic radioactive cadavers suffice to arrest the growth of the pro-nuclear forces? In other words, who can say that the politicians who are again

envisaging Italy's return to the civilian nuclear option will learn anything from the example of our four closed nuclear power plants? The operational life of the Gargliano, Latina, Trino Vercellese, and Caorso plants has now ended. From the technical standpoint they have entered the "decommissioning" phase, which in nuclear language means the complex of procedures for the complete dismantling of a nuclear power plant that has completed its life cycle.

"Unfortunately, no one knows how to carry out the decommissioning of a nuclear power plant in actual practice and with complete safety, not just in Italy but anywhere in the world," declares Melania Cavelli, researcher at the University of Reggio Calabria and author of *The Poison in the Concluding Scene*, one of the very few books on the decommissioning problem. "The technical protocols," she says, "have not been fine-tuned; we do not yet have the robotized tools to dismantle a plant; and we do not know how to store the thousands of tons of radioactive waste without putting the workers and the general public at great risk. And because not a single commercial power plant of medium or large capacity has ever been dismantled, there are no reliable estimates even as to the cost of the operation, which in any event would be high, so that if we finally must include it in our calculation of the real cost of a kilowatt hour, we will realize that it is not profitable to produce electric power by nuclear means."

These problems are well known to the specialists in the sector and to tell the truth, even to some politicians. As if he did not already have enough to do, however, Prime Minister Giulio Andreotti did not hesitate last Monday, 5 November to say that the PEN (National Energy Plan) should be reviewed and that serious reconsideration must be given to the nuclear option.

That is in substance what Republican Minister of Industry Adolfo Battaglia—always an enthusiastic advocate of the civilian use of the atom—has been saying for months. In short, with Saddam Husayn and the increase in oil prices functioning as accessories before the fact, consideration is again being given to the construction of nuclear power plants as a way to reduce our dependence on foreign energy sources.

The reappearance of uranium on the national scene is a matter of no small importance, considering that Italy abandoned the nuclear option with the referendum of 8 November 1987, when more than 65 percent of Italians said "no" to nuclear plants. Would it make sense to return to the concept of energy from the atom? History tells us that building these power plants is, after all, not so complicated. What is difficult is getting them to operate efficiently, without risk, without incident. It is difficult even to get them to remain standing: The very heavy reactors in some French plants are apparently sinking into the ground. Above all, however, their disposal poses a critical problem and is unavoidable for two reasons. The first reason is that many parts of a nuclear plant (including the walls) become radioactive after a

certain period of activity; the second is that after an extremely variable number of years the plants have deteriorated to the point that they do not provide adequate levels of safety.

In the case of almost all the nuclear plants constructed to date, the projected life span of from 30 to 40 years now appears to have been overly optimistic, inasmuch as a substantial number of these plants have had to be closed after operating only a few years. A good example is our Caorso plant (approximately 880 megawatts of installed capacity), which came on line in 1978 after a lengthy and troubled gestation and was closed in 1987 because it had reached the upper limit for shutdowns and restarts beyond which the plant was considered to be at risk. We consequently find ourselves today with a fair number of plants (at least 50) to be dismantled worldwide, and several dozen others whose useful life will end within a few years.

What can be done with this vast collection of atomic ruins? "The IAEA—International Atomic Energy Agency—long ago established the procedures for disposing of a plant no longer in use," explains Mario Conti, who is in charge of dismantling the nuclear power plants of the ENEA [Italian Committee for Research and Development of Nuclear and Alternative Energies]. The first stage, he says, is the "temporary closing of the plants under conditions of security." Generally speaking, this means mothballing the plant. The fuel (the uranium rods) is recovered and transported elsewhere. The so-called processing fluids are also removed: for example, the water in the cooling circuit. All the mechanical systems for opening valves are sealed. The plant must, however, be kept under continuous surveillance for safety reasons, because many highly radioactive structures (for example, the reactor) remain inside.

"The second stage consists of the so-called entombment—the cocooning, or burial," Conti continues. "In other words, the entire plant is isolated from the external environment by a complex structure consisting of reinforced concrete walls that can be removed. Even in this case, however, it is necessary to maintain surveillance over the area where the plant is erected."

"An alternative to encasing the plant in concrete," Conti says, "is dismantling—complete demolition—which strictly speaking is the only correct and definitive solution. Dismantling also entails enormously greater costs and considerable risk. In fact, it involves tearing the entire plant apart, from the internals (the support systems for the reactor core) to the vessel (the pressurized steel container that houses the reactor) and from the cooling and emergency systems to the biological shield, that is to say, the sturdy complex of reinforced concrete surrounding the vessel. And so on. All the radioactive and contaminated material must be transported to a waste disposal site."

What treatment are we applying to our four monuments to the nuclear era? ENEL [National Electric Power



Company]—the enterprise that produces electric power—has decided to take its time. "We have chosen to wait 30, 40, or 50 years before dismantling; we don't yet know exactly how long," explains engineer Clemente D'Anna, section manager of ENEL's nuclear activity unit. "The reason is that over a period of several decades the radioactivity released from the plants will decrease substantially. It will then be possible to work in greater safety. In the meantime, we shall bring all the plants to Stage 1: The fuel in the Garigliano plant has long since been recovered. The transfer of the charge of the Latina plant will be completed in the fall of 1991. It will then be the turn of Trino and Caorso, which the government declared closed only last June."

The option of marking time has, after all, been chosen by all countries that have closed nuclear power plants. It is equally true that as of today only two examples of the dismantling of commercial plants can be cited. The first example is the American nuclear power plant at Shippingport—with a capacity of only 72 megawatts—which was dismantled a few years ago. Unfortunately, that operation did not serve as a practical test of the "decommissioning" techniques, because it only involved removing the entire vessel, encasing the vessel in concrete, and transporting it to a waste disposal site.

For the second example we must go to Japan, to the Tokai-Mura nuclear research center, where during recent months the technicians have been carrying out demolition of the JPDR [expansion unknown]—a small reactor—with the aim of making it a laboratory for the study of decommissioning procedures.

The initial—and fundamental—operation is the measurement of the level of contamination in the entire plant. "In a nuclear power plant," engineer Conti says, "it is not just the core that is radioactive. The contamination spreads, for you have the mobile contamination: mud, sediment, and radioactive particles that are deposited on the inner surface of the water cooling pipes and auxiliary circuits, and so on."

"Then," he continues, "there is a fixed contamination that is bound into the materials. The process of uranium fission frees a large quantity of high-speed neutrons, and as a consequence of this irradiation certain materials become radioactive; for example, steel and iron are metals that contain impurities of cobalt, which is activated by the neutrons."

"The vessel and the internal structures are particularly subject to radiation. Outside these structures, the surface of the biological shield becomes radioactive—that is to say, the wall that protects the areas where the technicians and their metal armor are working. Indeed, the reason for waiting 30 or 40 years before dismantling is the fact that during this period the radioactivity of the cobalt is projected to decrease to levels near zero."

It is extremely important to measure the radioactivity with the utmost precision, primarily in order to calculate the maximum dosage that the workers can absorb while

they are engaged in demolishing the plant, and secondarily in order to stabilize the danger posed by the various dismantled components and on that basis classify them as waste of a high, medium, or low level of radioactivity.

Various experiments have demonstrated that surface contamination of radioactive particles can be removed by electrochemical processes and by washing with water or acid. "It has been proven that the particles adhering to the primary circuit can be removed with hydrochloric acid," Conti insists. Where washing is not successful, or where the contamination is fixed (as for example in the walls), the only option left is cutting.

"Cutting the steel or the concrete means producing dust—radioactive dust, obviously—that can travel a long distance. It is therefore necessary to cut the structures in a bath of water or oily fluid, which will eventually have to be disposed of as radioactive waste, thereby complicating the process," explains Nicola Conen, a consultant on the problem of decommissioning who is with the environmental organization Greenpeace.

"It is certainly necessary to proceed with the sensitivity and caution of a Carthusian monk, but it can be done," Conti insists. "In order to cut the vessel—a steel structure many meters in height—it is first flooded. In this way the water acts as a shield against the radiation and the technicians can work from above, using tools operated by remote control. In recent weeks the Japanese have tested a plasma torch that functions under water. The liquid becomes clouded even with this system, however; the telecameras can no longer provide clear pictures, and the water must therefore be filtered continuously. It is not a simple process."

"At ENEA," Conti says, "we are conducting experiments involving cutting with a carbon dioxide laser, which does not, however, function in water. The laser has yielded excellent results. The problem is that during the cutting process aerosol is created, which means that the laser must be used in an isolated compartment, in combination with systems for removing the smoke and gas."

The results of these experiments do not satisfy Melania Cavelli. "I repeat," she says, "the technical experts do not know how to dismantle a commercial nuclear power plant without risking a disaster. You need only read the official documents that report the results of lengthy studies and experiments. The principal insurmountable problem at present is how to measure the radioactivity diffused throughout a plant. Human beings cannot go near the most highly contaminated area and must therefore use robots, but no machines operated by remote control have yet been built that are small enough and sufficiently maneuverable to be able to move about in the confined areas inside and outside the vessel."

"The problem," she says, "is that the objective of the decommissioning technicians is to produce the smallest possible quantity of waste. The tendency is therefore to apply the label low radioactivity wherever possible, so

that the problems will be fewer and the costs of transportation and storage lower. It so happens, however, that many of the structures in plants classified as being of low or medium radioactivity do contain highly radioactive isotopes. One specific case is the Garigliano plant—closed in 1981—where traces of plutonium have been detected. Plutonium is a highly radioactive material with a half life of 24,000 years."

"The plutonium is present," she explains, "because beginning in 1968 this transuranic material was inserted—on an experimental basis—into the core of the reactor. Among other things, it wound up contaminating the Gulf of Gaeta, as is disclosed by various studies obtained from an official Italian source."

"Then there is another question that must be clarified," Melania Cavelli continues. "It is not true that after 30 to 40 years one can engage in operations at the plant without risk. Extensive scientific literature confirms that 200 years after the plant is taken out of service, the radioactivity at the center of the reactor is equal to 15 millirems per hour. It so happens that according to the most restrictive standards, the maximum dose to which a worker may be subjected in any one year is 25 millirems."

#### At a High Price

"Moreover," she says, "no one today has robots available that are sufficiently advanced to carry out the demolition operations efficiently. In short, dismantling is impossible from the technical standpoint and in no way advantageous from the economic standpoint."

One of the many problems is finding a place to bury the fragments of the plants. The demolition of a plant leaves a mountain of debris: The vessel of the Garigliano power plant—which has a very small installed capacity—is 11.5 meters in height, 3.8 meters in diameter, and 12.7 centimeters thick, while the protective shield is a wall consisting of a solid block of cement of approximately 972.27 cubic meters and weighing 2,187.60 metric tons. According to the estimate of ENEA's technical experts, "dismantling" a plant that has a capacity of 800-1,000 megawatts (MW)—which is more or less the capacity of Caorso—would probably yield at least 7,000-8,000 metric tons of contaminated debris, which must therefore be stored in special containers, transported along the nation's roads and freeways, and finally hidden away at safe storage sites, which in Italy—as we know—do not exist.

As to the cost both of the dismantling and of the subsequent storage of the debris, there is total uncertainty. Most studies indicate that the demolition of a plant would today cost from 20 to 30 percent of the original investment in its construction. Other studies conclude that the cost of disposing of the cumbersome cadaver would come to between \$1 million and \$2 million per MW. To decommission the Niederrachbach power plant in Bavaria—which was closed in 1974 by an incredible series of design defects after only 18 days of

operation—the German Government has appropriated 165 million marks, the equivalent of 124 billion lire.

"Actually," engineer Conti declares, "it is impossible to make reliable estimates. Each power plant has a history and characteristics that distinguish it from the others. The problems and costs of the decommissioning vary greatly depending on the type of power plant, its capacity, whether the reactor has been operated a few years or many years, whether there have been incidents, and whether the plant has remained closed for a long time before dismantling starts."

The engineer Paolo Degli Espinosa, a director of the Environmental League, has attempted to construct a balance sheet. "The decommissioning is very costly," he says, "because the entire nuclear cycle is burdensome from the financial standpoint. A nuclear reactor today requires an initial investment equal to approximately 5 trillion lire per 1,000 MW (5 million lire per kw) and the investment does not yield a return for 10 to 12 years, that is to say, for the duration of the construction—and the delicate fine-tuning—of the installations. Because at the end of the cycle the decommissioning will cost roughly between 30 and 50 percent of the cost of construction, the management must be prepared to expend a sum comparable to the original outlay. By comparison, a methane cogenerator or turbo-gas/turbo-steam system (a combined cycle) costs 1.5 million lire per kilowatt and requires three years for installation."

Even maintaining a nuclear power plant in Stage 1—the stage of "temporary closing under conditions of safety"—while waiting for several decades to pass before entering the dismantling stage will cost a fortune. Just to maintain the one plant at Trino Vercellese entails an annual expenditure of approximately 16 billion lire. Although it is true that the "Enrico Fermi" plant at Trino still houses the uranium rods and that its maintenance without the fuel would cost somewhat less, it would still cost many billions. Waiting for the fateful 30 years before initiating the demolition of our four atomic corpses would cost us between 1.5 trillion and 2 trillion lire—plus, of course, the cost of dismantling them in the year 2020.

In that case, and in view of this long and troublesome series of problems, would it not be advisable to keep the plants out of use forever in Stage 2, that is to say, maintain them for all eternity in a concrete sarcophagus—a solution being given serious consideration by several countries? On this point the pro-nuclear and the environmentalist experts do agree: They say "no." The huge gray tombs would constitute a disturbing presence and would have to be kept under surveillance for centuries. Nor would they provide any assurance that the radioactivity could be contained. The concrete cracks and develops fissures readily; the water could then seep through and transport the radioactive isotopes for great distances.

The Italian pro-nuclear forces, however, have found a new banner to march under—the banner of a nuclear option that is “intrinsically safe.” This involves reactors of medium to low capacity that are smaller than the existing ones and where safety would be ensured not by the intervention of man but by a law of physics, as for example the law of gravity, so that in the event of an incident the reactor would presumably be deactivated of its own accord.

It will probably be many, many years before we have the intrinsically safe plants that Minister Adolfo Battaglia favors so strongly. And when all is said and done, what kind of solution would that be? Even these small nuclear plants will—during their useful life—produce highly radioactive uranium waste, and sooner or later these too would have to be dismantled, demolished, broken into pieces. How, when, by whom, and at what price? It is a problem that will be passed on to the coming generations.

## SWEDEN

### Public Increasingly Favorable to Nuclear Energy

91EN0189B Stockholm SVENSKA DAGBLADET  
in Swedish 1 Dec 90 p 6

[Text] A growing number of Swedes favor nuclear power. The pronuclear tendency in Swedish public opinion is continuing. According to the Swedish Institute of Public Opinion Research [SIFO], 64 percent of Swedes now feel that nuclear power will have to stay or that it will not be phased out until after 2010. In its latest survey SIFO also notes that now a majority of women (52 percent) also favor the use of nuclear power after the year 2010. In the previous poll, in May 1990, 49 percent of the women favored nuclear power.

In setting priorities among nuclear power, sulfur dioxide limits, and undeveloped rivers, 66 percent said it is most important to prevent sulfur dioxide emissions from increasing.

The poll was commissioned by Nuclear Power Safety and Education AB. The poll was conducted in weeks 46 and 47 and included 1,087 people.

## SWITZERLAND

### State of Nonproliferation Controls Assessed

91WC0031A Zurich DIE WELTWOCHEN in German  
8 Nov 90 p 25

[Article by Felix Mueller: “If Only You Knew Who Is Planning Nasty Things...”—first paragraph is WELTWOCHEN introduction]

#### [Text] Progressive Switzerland?

Until recently the problems in the arms trade were simple: Should Country A deliver tanks or guns to

Country B? However, the Iraqi example has shown that the debate will increasingly revolve around the export of technologies that could be used for military applications. The United States is considering tighter export legislation; the FRG has drastically tightened its regulations. In Switzerland as well there is movement in this direction.

The fact that the Ariane consortium is going to help Brazil build a powerful rocket engine is no longer a surprise to Gary Milhollin, perhaps the best U.S. expert in the field of arms trading: “Under French leadership, the Ariane group has since the mid-1970’s repeatedly bought satellite launch contracts at the cost of passing on rocket technology to Third World nations.” In this case as well, he presumes that the close cooperation is intended to make it easier for Brazil to use the Ariane for launching satellites in the future and not the Delta rocket produced by McDonnell-Douglas. This trump card is likely to succeed, since the U.S. company cannot compete with what Europe offers because it would incur penalties for passing on such technologies. The government in Washington has thus drawn the necessary consequences from the fact that Brazil frequently resells know-how with military applications received from Western industrial nations for civilian use. For example, Iraq profited immensely from Brazilian know-how when building its rockets.

To be sure, the Ariane consortium protests that it is convinced of the Brazilians’ civilian intentions, and no one can prove the opposite. Is it right, based solely on supposition, to deny a country access to technologies only because they could also be used for military purposes?

The days when one could get agitated about exporting tanks and guns are gone! The proliferation debate of the future will increasingly revolve around the problem of exporting know-how, and nothing could have impressed this realization more strongly upon the consciousness of the politicians and the general public than the Kuwait crisis. Because today—thanks to Western support—Iraq possesses production capacities for means of mass destruction which could turn any war into a bloody undertaking.

All industrial nations participated in the technological armament of Iraq. Although Switzerland—except for fire control equipment—did not directly deliver any weapons, in 1989 alone it delivered machinery worth 189 million Swiss francs, and, based on Saddam Husayn’s industrial-political priorities, it must be assumed that the lion’s share found application in the armament sector. This is of course a modest sum in comparison with the order volume filled by the German economy in Mesopotamia, and the United States as well supplied this market with high-tech products worth \$1.5 billion over the last five years. Now they are more or less sleeping alone in the bed they made, while most other nations quickly take cover behind the Yankees’ broad back but do not exactly stint with good advice as to how the conflict could best be solved.



The value and the composition of the U.S. exports are so precisely known because the U.S. legislation is so strict. Concerning outright arms sales, Congress has the right of codetermination for transactions of \$50 million and up, which guarantees that most of them are made public. Other than that, the United States has a general licensing obligation for exporting high-tech products. As is shown by the Iraqi example, this does not mean that no errors are made, but they are always made knowingly and publicly. Even so, Washington would like to tighten the screw even more: Congress recently passed a law which would use trade sanctions to punish countries or companies that participate in the development of weapons of mass destruction. However, President George Bush is likely to veto this for reasons of politics as well as international law.

Then a few days ago the State Department published a proposal, according to which an export ban would be imposed on all products which in any form could help a country in the secret development of nuclear, chemical, or biological weapons. The main part of the new law would be two lists: one list of countries with the names of all the nations which conduct such programs and one product list, which includes everything that in any form facilitates the completion of such plans—PCs, machine tools, chemicals, as well as heavy trucks. U.S. trade and industry protested these plans vigorously. The spokesman for the American Chamber of Commerce declared: "Without international agreements like Cocom [Coordinating Committee for Multilateral Export Controls], such measures have no prospects of success."

#### Painful Case

This supposition is perhaps not incorrect, since outside of Cocom (which primarily regulates West-East trade) export standards do in fact vary greatly. Herbert Wulf of the Stockholm Peace Research Institute SIPRI [Stockholm International Peace Research Institute] states that "France, for example, exports practically everything, whether it involves weapons or know-how." The FRG, on the other hand, has always had very restrictive regulations for exporting actual weapons. "Presumably, that is why German industry specialized in exporting know-how and acted according to the motto: What is not prohibited is permitted." It was the incident of the poison gas factory in Libya which first led Bonn to undertake a course correction. The list of products requiring licenses was greatly expanded, and police control was intensified as well as extended to cover mere brokering. Furthermore, in the future the law will include activity by individual citizens abroad. An engineer employed by an Iraqi firm to work on rocket development will in the future thus also be involved with German justice.

Because of this development, Switzerland has also come under pressure to do something, since the existing regulation avoided the area that is increasingly developing into the central discussion point: The decree of the War Materials Law maintains that the concept of "war materials" covers only objects which "in the same form have no civilian application." Hence, Switzerland permits export

of all "dual use" products. Bern realized for the first time how untenable this position was in connection with the Gulf war between Iran and Iraq, since Switzerland as late as 1985 delivered 14 tons of thiodiglycol to Iraq—a substance which is used to produce mustard gas. Saddam Husayn used mustard gas to murder more than 5,000 Kurds. In 1987 the Federal Council, contrary to the wording of the regulation, put eight chemical substances on the index because they could also be used militarily. The list has since been expanded twice and includes 17 new chemicals.

A second case that was embarrassing to Switzerland was made public in 1989. The NEW YORK TIMES revealed that the Krebs engineering firm headquartered in Zurich had built a chemical plant in Egypt which in fact and truth was a production plant for chemical weapons. The information in the same article that the good Zurich engineers had also accepted a contract to build a pharmaceutical factory in Iran lit a fire under the Federal Council: It beseeched the company to give up that project, which it also did. In this case Bern played the role of supplicant and, absent the legal foundations, had to work with moral persuasion. Rene Pasche, proliferation specialist at the Department of Foreign Affairs in Bern, was of the opinion that "if need be one could still have used Article 102 of the Federal Constitution as a basis—which has already been done in two or three other cases. But that would really have been a stopgap measure."

In order to give the government a more solid legal tool in the future, the administration is at present working on a law which applies to the export of products which could serve to produce chemical or biological weapons as well as rockets. But it is still unclear whether purely intermediary activities or financing actions are to be included. An expansion to include exports of all high-tech products is not envisaged, however, which puts Switzerland behind the regulations of the United States or the FRG, but compared to other European countries would still leave it in a relatively good position.

A draft of the new law is likely to be the subject of hearings early next year. An uncertain outcome is predicted for it, but the law will only be as effective as the opportunities to monitor it, of course. Until now Switzerland has regularly had U.S. or West German intelligence service sources to thank for such hints and tips. "The Federal Police," a top official in Bern complains, "are totally outnumbered in this area."

And even if the police were coping beautifully with their task, "the problems that occur in this area are considerable from an objective point of view," says Herbert Wulf at SIPRI in Stockholm. "The difficulty consists in early recognition of which countries one can cooperate with in the field of technological exports." In other words, the problem is that humans err: 10 years ago Iraq was held to be worthy of cooperation, and now the West is belatedly trying to put the cork back in the bottle it helped open.



**UNITED KINGDOM**

**Iraqi Envoy Threatens To Use Cruise Missiles**

*LD1801215791 London PRESS ASSOCIATION  
in English 2024 GMT 18 Jan 91*

[Report by Mark Duff]

[Text] The Iraqi ambassador in London today threatened to use unexploded Cruise missiles to attack allied forces in the Gulf. Dr. 'Azmi Shafiq al-Salihi told the PRESS ASSOCIATION that Iraqi troops had shot down 23 of the missiles during the continuing allied air offensive on Iraq and Kuwait. He added that others had been recovered intact. "So we will get the benefit of them and use them against our enemy," he said.

Dr. Al-Salihi said he did not know how many of the missiles were recovered but said he was confident Iraqi technicians would be able to use the weapons to attack allied troops. He defended the Iraqi decision to fire Scud missiles at Israel. He said: "We consider Israel to be the main factor of tension in our area. It's behind all the problems we have in our area."

Among the targets he confirmed as having been hit by the attacks on Baghdad were the headquarters of the Ba'th party and the presidential palace. "These are in populated areas, so you can imagine the consequences," he said.

The allies had themselves claimed to have launched 2,000 raids on the country, he said. "You can imagine the casualties among the civilians in Baghdad."

**Nuclear Power Opinions Polled in USSR, Finland**

91WP0023A Helsinki HELSINGIN SANOMAT  
in Finnish 14 Oct 90 pp A3, C5

[Article by Pekka Vuoristo: "HELSINGIN SANOMAT Poll: Four Out of Five Finns Would Accept New Nuclear Power Plant"—first paragraph is HELSINGIN SANOMAT introduction]

[Text] One out of every two Finns regard [nuclear] power plants as being at least fairly safe. A HELSINGIN SANOMAT Gallup poll indicates that Finns have greater confidence in the safety of these plants than they used to. Finns are concerned less over environmental pollution than they are over our neighbors in the East and the West.

Almost four out of every five Finns are now at least somewhat inclined to accept a fifth nuclear power plant. Opinions have changed during the past two and a half years to become more in favor of the power plant, although a clear majority of Finns still view a new plant negatively.

In January 1988 only three out of 10 Finns supported a new nuclear power plant unconditionally or with some reservations. A big change of opinion has occurred among its opponents: Only a third [of the population] is any longer absolutely against the plant, whereas nearly half still opposed it in January 1988.

One out of every two Finns has confidence to at least some extent in the safety of nuclear power plants. Confidence in them was never once as great as it is now during the 13 years that the Finnish Gallup Company has been measuring it.

Over a thousand Finns were interviewed in August-September in an opinion poll on energy and environmental concerns. The interviews were conducted at the start of the Persian Gulf crisis.

During the poll, the opinions of residents of Sweden and Estonia as well as of the city of Leningrad were also polled. The Finns revealed themselves to be the most satisfied with the state of their country's environment. They were also the least concerned over pollution. The Leningrad residents assigned the state of their country's environment the lowest ratings.

One out of every two Finns feels that nuclear power plants are perfectly or fairly safe. Finns' confidence in the safety of nuclear plants has increased over the past three years: Only four out of 10 had confidence in their safety in 1987.

In 1987 the disaster of the preceding year at the Chernobyl power plant was still fresh in people's memories. At that time, 18 out of every 100 Finns felt that nuclear power plants were not at all safe. Now, only 12 out of 100 are of that opinion.

The Finnish Gallup Company has been measuring Finns' faith in the safety of nuclear plants since 1978, and their confidence in it has not once during that period been as great as it is now.

The opinions of residents of Sweden and Estonia as well as of the city of Leningrad were also reflected in this poll conducted in August-September of this year. It is evident that Swedes have confidence in nuclear power plants even more clearly than Finns: Eight out of every 10 Swedes felt that they are perfectly or fairly safe.

In Estonia and the city of Leningrad, they do not have faith in the safety of nuclear power. Seventy-five percent of the residents of Estonia and fully 86 percent of the residents of Leningrad were of the opinion that nuclear power plants are not very or not at all safe.

The majority of the respondents in all these countries opposed construction of a new nuclear power plant in their country. Opposition was weakest in Finland: Four out of 10 Finnish respondents supported a new nuclear plant either without further ado or "to some extent."

Finns' attitudes have changed to being more in favor of a new nuclear plant since a similar poll was conducted in January of the year before last. At that time, only three out of 10 were favorably disposed to the construction of a new nuclear power plant. In early 1988, fully 46 percent absolutely opposed a new plant, but only 31 percent did in late summer of this year.

Opposition to a new nuclear plant is strongest in Estonia: Nearly nine out of 10 respondents viewed a new nuclear plant negatively. In Leningrad, too, eight out of 10 opposed a new plant. In both Leningrad and Estonia, a clear majority of all the respondents were absolutely opposed to a new nuclear plant.

**Everyone Wants More Natural Gas**

While Swedish respondents believed in the safety of the plants almost to a man, only a good third of them supported construction of a new nuclear plant. The Finnish Gallup Company interprets this as meaning that Swedes would be satisfied if the decision made a few years ago to close down the then-existing nuclear power plants were rescinded. They were not separately questioned about this matter in the poll.

Although Swedes do not want a new nuclear plant in their own backyards, they would nevertheless rather have a nuclear than a coal-burning power plant. In Finland and Leningrad, on the other hand, a coal-burning plant was viewed as a better alternative than a nuclear plant.

A coal-burning or oil-shale-burning plant was the alternative to a nuclear plant on the Estonians' questionnaire. The great majority—58 percent—of the Estonian respondents would prefer to have a plant employing fossil fuels in their home districts. This was the opinion of Estonia's Estonian population in particular. This

response may be an indication of their deep mistrust of nuclear power, which they feel to be "Russian." At any rate, it is not a sign of great enthusiasm for polluting oil shale: Only one out of every 10 Estonian respondents would like to increase its use, and the Estonian population reacted to an increase in its use even slightly more coolly than Estonia's Russian and other ethnic populations.

In the other countries, the majority of the respondents would not be willing to have a nuclear power plant in their neighborhood any more than they would a coal-burning plant. Well over a fifth of the Finns and Swedes felt them to be equally [undesirable], as did more than a third of the Leningrad residents.

If the respondents could decide for themselves which source of energy they would increase the use of, in none of the countries would they resort to coal. Instead of it, natural-gas-burning plants would be built in all four countries. The Finns and the Swedes, especially, place their faith in natural gas.

Water power placed second in all the countries. In Sweden an absolute majority of the respondents supported an increase in the use of water power. Aside from closing down its nuclear power plants, Sweden has also officially decided to keep its northern rivers flowing freely. In Finland, too, four out of 10 respondents would put more water power to use.

In both Sweden and especially Finland, there was clearly less support for an increase in the use of nuclear power in general than for the construction of a new nuclear power plant. Gallup interprets this as meaning that in Finland some of those who in principle oppose further development of nuclear power are reluctantly prepared to accept a new plant "as a necessary practical solution to the problem."

The majority of Finns, Swedes, and Estonians were in principle of the opinion that the interests of environmental protection must come before those of the economy and employment if a choice must be made between the two in arriving at important decisions. In Gallup's experience, this is always the result when people are asked for a principled opinion on the matter. It was, however, difficult for the Leningrad residents to form an opinion on the matter—over two-fifths of them could not respond to the question.

**How Finns React to the Construction of a 5th Nuclear Power Plant (in percent)**

	January 1988	September 1988	August-September 1990
I support it	13	18	15
I support it somewhat	17	19	24
I oppose it somewhat	19	22	26
I oppose it	46	39	31
Cannot say	5	3	4

#### **Finns Least Concerned Over Environment**

In both Finland and Sweden, roughly half of the respondents were more or less dissatisfied with the state of the environment in their own countries, whereas the other half were satisfied with it. The Finns were somewhat more satisfied with it than the Swedes—in Finland the majority of the respondents only stated that they were among those who were at least "fairly satisfied with it."

Over 90 percent of the respondents in Estonia and Leningrad were dissatisfied with the state of the environment. The situation was felt to be the worst in Leningrad, where fully two-thirds of the respondents said that they were particularly dissatisfied with it.

The majority of the respondents in all the countries felt that pollution of the natural environment was a serious problem in their own countries. In Estonia and Leningrad, practically all of the respondents were of the opinion that fully eight out of 10 persons in Leningrad viewed the problem as being "extremely serious." They were the least concerned in Finland: One out of every five respondents felt that pollution was not an especially serious problem. A very few of them even thought that it

was not a serious problem at all. No such opinions were offered in the other countries.

The general opinion in all of the countries was that the condition of the natural environment in the countries had worsened during the past 10 years. The Swedes' view of the situation was a bit brighter than those of the others; "only" three-fourths of the Swedish respondents felt that the situation had changed for the worse. In Finland, 84 percent of the respondents were of that opinion, and fully 92 percent were so in Leningrad.

The most common view in Estonia and Leningrad was that their countries are more polluted than the countries of Western Europe; a clear majority of the respondents were of that opinion in Leningrad. Quite a few of them, however, had difficulties in forming a clear opinion on the matter: One out of every three in Estonia and one out of every four in Leningrad could not answer the question.

In Finland and Sweden, on the other hand, the majority think that pollution has not gone as far in these countries as it has in Western Europe. The Swedes took a slightly more favorable view of their country's relative condition than did the Finns.

The respondents were also asked to identify the country most to blame for pollution of the Baltic. In Finland, Estonia, and Leningrad, they considered the Soviet Union to be the biggest source of pollution, although a very large number of the residents of

Estonia and Leningrad could not answer the question at all. The Swedes, on the other hand, indicated that Poland was chiefly responsible for it. East Germany got more votes from the Swedes than did the Soviet Union.

#### Respondents Wishing To Increase the Use of the Given Sources of Energy (in percent)

	Finland	Sweden	Estonia	Leningrad
Coal	15	6	15	11
Natural gas	63	64	50	43
Water power	43	53	44	32
Nuclear power	22	17	4	11
Oil	14	4	42	19
Oil shale	—	—	11	—

Note: One energy source at a time was cited for the respondents, and they were asked "whether its use should be increased, reduced, or remain unchanged." The chart shows how large a percentage of the respondents wanted to increase the use of a given source. The Swedes supported water power, even though Sweden has decided to protect its undammed northern rivers. Surprisingly so, the Estonians were interested in oil, even though the poll was conducted after the Persian Gulf crisis erupted.

#### Respondents' Impressions of the Safety of Nuclear Power Plants (in percent)

	Finland	Sweden	Estonia	Leningrad
Completely safe	4	14	2	3
Fairly safe	47	68	5	6
Not very safe	35	12	26	15
Not at all safe	12	4	59	71
Could not say	3	2	7	4

Note: The respondents were asked: "What is your impression of the safety of nuclear power plants?" They could choose one of the options on the chart. The Swedes, whose nuclear power plants they have decided to close down, had the greatest confidence in their safety. The confidence of the Finns was greater than it was in any earlier similar Gallup poll.

#### How the Respondents Reacted to the Construction of a New Nuclear Power Plant in Their Country (in percent)

	Finland	Sweden	Estonia	Leningrad
I support it	15	16	2	8
I support it somewhat	24	19	6	4
I oppose it somewhat	26	19	20	7
I oppose it	31	43	68	75
Cannot say	4	4	4	6

Note: The respondents were asked for their reaction to the proposal "that one more nuclear power plant be built in our country." They could choose one of the options on the chart. Although the Swedes have faith in their nuclear power, only a third of them want more of it. In Finland, quite a lot of people will accept a new power plant—at least they will with some reservations—although rather few of them support an increase in the use of nuclear power per se.

#### The Importance the Respondents Would Assign the Environment and the Economy in Making Decisions (in percent)

	Finland	Sweden	Estonia	Leningrad
Protection of the natural environment is more important	62	57	73	36
The economy and employment are more important	24	20	12	20
Cannot say	13	23	15	44

Note: The respondents were asked to say which is more important "if views on protection of the environment conflict with views on the economy and employment when making important decisions." The inability of Leningrad residents to form opinions on this may be a sign of the uncertainty the collapse of the Soviet economic system has produced.



Level of Satisfaction of the Respondents With the State of Their Country's Environment (in percent)

	Finland	Sweden	Estonia	Leningrad
Very satisfied	5	5	1	1
Fairly satisfied	51	42	6	5
Rather dissatisfied	33	40	41	26
Very dissatisfied	10	11	50	67
Cannot say	1	2	2	1

Note: The respondents could choose one of the options on the chart to indicate what they thought about "the state of the natural environment in our country." Only a clear majority of Finns were at least fairly satisfied with the state of the environment in their country. In Estonia and Leningrad, they feel that the environmental situation is really serious.

Countries Held Responsible by Respondents for Pollution of Baltic (in percent)

	Finland	Sweden	Estonia	Leningrad
East Germany	9	14	2	1
West Germany	9	8	2	3
Soviet Union	45	12	49	42
Poland	13	52	1	4
Sweden	2	1	0	2
Finland	—	1	0	2
Denmark	—	0	—	2
Baltic countries	10	8	11	4
Cannot say	11	5	34	40

Note: The respondents were asked: "Which of the following countries is most responsible for the pollution of the Baltic?" The Swedish respondents had the impression, which differed from those of the others, that Poland is the worst polluter. This may be due to nothing more than geography: Of the countries polled, Sweden is the closest to Poland. The difficulties of Estonians and residents of Leningrad in saying anything about the topic may be an indication of the lack of information available to them.

#### Sole Providers Most Vehemently Opposed to Nuclear Power

If the men could decide, a fifth nuclear power plant would apparently be built in Finland. A clear majority of the male respondents felt that nuclear power is safe, and a small majority also supported a new power plant. A clear majority of the women had doubts about the safety of these plants and opposed a new power plant.

The women would rather have a coal-burning plant in the vicinity of their home than a nuclear power plant, whereas the men would choose a nuclear plant.

The most vehement opponents of nuclear power in Finland are the sole providers: An overwhelming majority of them felt that nuclear power is not safe and opposed construction of a new nuclear power plant.

The younger respondents felt that nuclear power is safer than did the older ones. The well educated trusted nuclear power more than did the poorly educated, the city dwellers more than did rural populations, the inhabitants of Southern Finland more than did those of the north, and those with high incomes more than did those with low incomes.

The well educated were more willing than the others to reduce our use of coal and oil in order to increase the percentage accounted for by nuclear power.

Of the constituents of the different parties, the Conservatives were especially in favor of nuclear power: About two-thirds of them considered it to be safe and were in favor of a new power plant. A majority of SDP [Social Democratic Party] and Center Party constituents also trusted in their safety, at least to some extent, although they did not support a new plant.

Nearly half of the Greens supporters that happened to be interviewed felt that nuclear power was fairly safe. Nevertheless, a clear majority of the Greens opposed a new plant, although one out of every five of them was willing to accept one with at least some reservations. Over a third of the Left Alliance constituents would favor construction of a new nuclear plant.

The Conservative Party and Left Alliance supporters were more interested than the others in increasing the use of water power. The most zealous defenders of water power were the Center Party and Rural Party supporters. Nearly one of every two Greens supporters also supported an increase in the use of water power.

Only Conservative Party constituents would be concerned about having a nuclear power plant rather than a coal-burning plant in their home districts. The opinions of the Social Democrats on this issue were fairly evenly divided. On the other hand, two-fifths of the Greens chose coal and one-fifth nuclear power.

An increase in the use of natural gas was quite unanimously supported. Only one group, in which a minority favored it, got caught in the interviewers' net—those women who had declared themselves to be supporters of

the Left Alliance—because in that very small remaining group, you see, fully one out of every four could not say where she stood on natural gas.

**Finnish Men's and Women's Views on Nuclear Power (in percent)**

How safe are nuclear power plants?	Men	Women
Perfectly safe	65	38
Not very or at all safe	34	59
<b>A new nuclear power plant for Finland?</b>		
I fully or somewhat support it	53	27
I fully or somewhat oppose it	44	69

#### **Farmers More Satisfied With State of Environment**

In Finland there is a clear connection between the sex of the individual and how satisfied he or she is with the state of the environment. The men who were interviewed for the poll see the situation as being brighter than do the women.

Nearly all agreed that protection of the environment is a more important concern than the economy and employment as a basis for making decisions. The well-educated respondents were more unanimous on the matter than the less well educated, and those who earn more were more unanimous than those with lower incomes.

Students who have passed their university and college comprehensive exams felt that Finland's environment was in somewhat worse shape than did those respondents who are less well educated.

Farmers view their environment somewhat more cheerfully than do businessmen, government employees, and workers. While farmers held opinions similar to those of the others, they felt that the state of the environment was somewhat better, pollution a bit less of a problem, and the changes in the state of the environment over the past few years a bit less alarming than other changes.

The residents of Greater Helsinki were more dissatisfied with the condition of the environment than the populations of the cities and rural areas, but the situation was otherwise viewed more gloomily in Northern Finland

than elsewhere in the country. More than the others, the inhabitants of Southern Finland and the big cities emphasized that protection of the environment should take precedence when making decisions.

The Conservatives were more satisfied with the state of the environment than the other supporters of the different parties, whereas Greens supporters, on the other hand, were clearly more dissatisfied than the others. The Greens and Left Alliance supporters, when making decisions, accorded environmental protection precedence more clearly than did the others. One out of every three Social Democrats felt that it is more important to take a stand on the economy and employment than on protection of the environment, whereas only one out of every four of all the respondents were of this opinion. This opinion was most favored among Social Democratic males and Social Democrats over age 34.

Nearly one out of every four farmers could not say who is most responsible for the pollution of the Baltic. The Soviet Union was felt to be responsible by slightly more businessmen than workers, although all the groups' opinions on the matter were similar.

Left Alliance constituents named the Soviet Union the number-one polluter of the Baltic clearly less often than did those who declared themselves to be supporters of the other parties. More than one out of every four Left Alliance supporters could not name the number-one polluter at all. Only one out of every 10 of all the respondents had not formed an opinion on the matter.

**Finnish Men's and Women's Level of Satisfaction With the State of the Environment (in percent)**

	Men	Women
Very or fairly satisfied	62	51
Very or fairly dissatisfied	38	48

#### **This Is How the Poll Was Conducted**

The opinion poll was conducted by interviewing 1,021 persons in Finland, 1,039 in Sweden, 993 in Estonia, and 499 in Leningrad. Those interviewed were chosen so that they represented the populations over the age of 15 of the countries involved and the city of Leningrad.

The interviews were conducted between 23 August and 25 September 1990. Leningrad residents were interviewed by telephone; those interviewed elsewhere were met in person.

The Finnish Gallup Company conducted the poll in Finland; the SIFO [Swedish Institute for Public Opinion

Polls] Company in Sweden; the state research institute, Mainor, in Estonia; and the Finnish Gallup Company and the Soviet state joint venture, Marketing Information Center, in Leningrad. The poll was ordered by HELSINGIN SANOMAT.

#### Effects of Nonproliferation Treaties Assessed

91WC0025A Zurich DIE WELTWOCHEN in German  
1 Nov 90 pp 7, 9

[Article by Felix Mueller: "No Piece of Paper Stops a 'Merchant of Death'"]

[Text] It is characteristic of one of the schizophrenic states of our times that one distinguishes between authorized and unauthorized weapons—as if death caused by a napalm bomb, at least as far as the result is concerned, were different from death caused by a nuclear bomb. Nevertheless, the attempt to draw such a distinction is a first step toward creating a world entirely devoid of weapons of mass destruction.

If one examines the arsenals of Iraq's Army from this point of view, one finds not only almost everything that is allowed but also everything that is not allowed. Contrary to the Geneva Protocol of 1925, which Baghdad signed, Iraq has employed poison gas extensively. Contrary to the treaty on biological weapons signed in 1972, Saddam Husayn is working on the development and production of such weapons, nor could the Nuclear Nonproliferation Treaty of 1970 prevent, in the opinion of Israeli and English experts, Iraq's being only two to five years from detonating a nuclear device. Is Iraq, consequently, proof of the futility of all efforts to block the proliferation of weapons of mass destruction with international treaties?

The Nuclear Nonproliferation Treaty, ratified in 1970 and so far signed by 170 countries, prohibits the release of nuclear weapons to others or any assistance in the development of such weapons. From the very beginning it was a flaw that two of the then five nuclear powers—China and France—remained on the side lines. It was part of France's foreign policy stance—considered brilliant in Paris—to help Iraq of all places in developing a civilian nuclear program. Israel, on the other hand, had no illusions from the start about the real purpose of this project and in 1981 destroyed with a daring bombing raid the Osiraq reactor in a suburb of Baghdad.

After this setback Saddam Husayn decided to follow the example of China and Pakistan by obtaining enriched uranium by a slower but less obvious method. This method first transforms uranium ore into uranium hexafluoride which is then processed by a battery of centrifuges into a type of enriched Uranium suitable for use in a nuclear bomb. There are indications that Pakistan shared some of its relevant expertise with Iraq and that Iraq returned the favor by passing on illegally acquired components. It is known that three German firms helped Iraq construct and operate gas centrifuges which must have been of incalculable help to Baghdad

since the process, while not especially difficult scientifically, is technically quite tricky. However, the fact that initial difficulties have been surmounted can be surmised from a minor incident that happened in London in the spring. At the last moment it was possible to intercept a shipment of special fuses suitable only for nuclear bombs. One is not likely to be concerned about fuses unless one thinks about igniting something at some time.

However, Iraq is but the last, though possibly the most unpredictable, candidate for the club of nuclear powers. Six additional countries—Argentina, Pakistan, Brazil, India, Israel, and South Africa—have acquired membership status since 1970, and it is assumed that India, Israel, South Africa and, most recently, also Pakistan have operational nuclear weapons.

One can, of course, consider this proof that the Nonproliferation Treaty has failed. Peter Herby, who follows the Geneva disarmament negotiations for the Quakers, expresses guarded optimism: "The treaty has at least delayed the proliferation of nuclear weapons." However, he thus concedes that the treaty has structural gaps and weaknesses. Its greatest shortcoming: "Only commerce in fissionable material is regulated. As long as this provision is observed, one cannot speak of treaty violations." Neither the supplier of gas centrifuges nor the supplier of uranium hexafluoride violates the letter of the Nonproliferation Treaty. Herby explains: "Although as a result of informal discussions most industrial nations have placed critical products under export controls, specific enforcement is handled by the individual countries. If a country looks the other way, international law does not apply." An instructive example of how different standards are applied to such laws is offered by Brazil, which has exported a considerable amount of nuclear technology to Iraq, technology which it originally acquired from the Federal Republic of Germany for a civilian project.

In five years the treaty signatories will have to decide on its fate. The negotiations are not likely to be simple, especially since the refusal of the United States and Great Britain to engage in lateral discussions about a nuclear test ban complicates the issue. However, the authors of a study just published in Germany come to the conclusion that an extension, "despite the treaty's undeniable flaws," is greatly preferable to any attempt to renegotiate, since "without a treaty it would probably be even more difficult to stop the proliferation of nuclear weapons."

The situation is similar with regard to biological weapons. An agreement was concluded in Geneva in 1972 which banned not only the production but also the development of such weapons. Western intelligence services are convinced that Saddam Husayn will soon have operational biological weapons at his disposal. Aside from such laboratory equipment as incubators, drying chambers, nutrient solutions, and fermentation facilities—acquired in Germany—Baghdad, in 1985,



obtained three portions of the West Nile Fever virus from the Center for Disease Control in Atlanta and, two years later, Josef Kuehn of Neustadt, Lower Saxony, delivered 100 milligrams each of the highly poisonous mushroom poisons (mycotoxin) HT-2 and T-2 to the same address for barely 60,000 German marks [DM]. The "scientific interest" with which Baghdad justified its purchases could, in the opinion of the Stockholm Sipri [Stockholm International Peace Research Institute] peace institute, aim in only one very specific direction: Mycotoxins, even if only minute quantities touch the skin, are guaranteed deadly and, therefore, are particularly well suited for sabotage missions. Recently a CIA study came to the conclusion that within a few months Iraq will have developed operationally ready biological weapons, particularly anthrax which can cause possibly fatal bleeding. Moreover, work on food-poisoning agents or substances, which can cause the plague, cholera, anthrax, or typhoid, seems well-advanced.

Technically Iraq may not even have violated the 1972 agreement since that agreement does not prohibit biological weapons research. At what point research ends and development begins is, of course, a wide-open question. Here, too, the negotiators have failed to define effective control procedures. So far, however, there has been no real proliferation of biological weapons, one reason being, in the opinion of English expert Julian Robinson, that bacteria and viruses are not good weapons: "One employs a living organism to attack another living organism. Many unpredictable events could occur and generals prefer resources which they can control." However, whether a cornered Saddam Husayn might lose all control, is the anxious question behind all the current gas mask drills in the Saudi Arabian desert.

In contrast to biological weapons, the world has already acquired considerable experience with the effects of chemical weapons. At the turn of the century the first experiments to exploit chemistry militarily also triggered the first attempts to stop such a development which did not deter the German Imperial Army from employing mustard gas in 1915 in an attempt to penetrate the French lines near Ypres. Two years later both parties were shooting poison gas grenades at each other. Images of dead and wounded soldiers so inflamed world public opinion that the Geneva Protocol was negotiated in 1925 to ban the employment of all chemical weapons. However, the agreement was violated for the first time by the Duce [Mussolini] in Abyssinia no more than 10 years later.

All large powers had chemical weapons in their arsenals at the outbreak of World War II. Those of the Soviet Union were the result of German "development assistance" in the wake of the Rapallo Pact. They were not used [in World War II] since both sides had serious reservations about their military utility. Instead, the Nazis applied their knowledge to the "Final Solution" of the Jewish problem. Millions of people were murdered in concentration camps with a modified insecticide called

Zyklon-B. This use seemed at last to be sufficiently persuasive to declare poison gas taboo.

However, to Mark Storella, who handles this subject in the State Department in Washington, it seems that "such restraint has rapidly decreased in the seventies and eighties. Egypt used poison gas in Yemen, the Soviet Union apparently in Afghanistan, Vietnam in Cambodia and Laos, and—most important—Iraq (and Iran) in the Gulf War." How did Saddam Husayn acquire these weapons? With German engineering skill and German export acumen. German "merchants of death" placed no less than six production facilities in the sand of Iraq and these "petrochemical" plants produce not only such traditional poisons as mustard gas or the nerve gas Tabun but also highly concentrated hydrogen cyanide which can destroy the filters of ordinary gas masks.

The obvious weakness of the Geneva Protocol—it only prohibits the employment but not the production of chemical weapons—led in the mid-sixties to the inclusion of chemical weapons in deliberations of the Geneva disarmament conference. These efforts were made all the more difficult by the fact that till the mid-eighties nobody except the United States—which, however, had discontinued production in 1969—admitted owning such weapons.

The Soviet Union, on the other hand, greatly expanded its supplies in the years that followed which finally induced Ronald Reagan in 1984 to give the green light to a resumption of production. He showed political acumen by combining this decision with a proposal for a total ban and by promptly submitting an appropriate treaty draft.

Moscow did not respond at first; but then came glasnost and with it the admission of considerable activity in this area. It did not stop there, the Soviet Union suddenly joined the side of the United States in Geneva. Thus, a decisive breakthrough had apparently been made.

However, the conclusion of a treaty still remains slow in coming. The chief of the American delegation in Geneva, Ambassador Stephen J. Ledogar, commented that he arrived in Geneva early this year feeling "great optimism and enthusiasm" but that these sentiments have since been replaced by much more sober emotions because "only very modest progress has been made." Other voices even claim that the negotiations are "simply bogged down."

Why? One reason is the devilish nature of the details. The production of chemical weapons is relatively easy and based on processes and substances which also have civilian applications. A ban, therefore, only has a chance to be really effective if the treaty provides for rigorous controls at short notice. But where do controls end and where does industrial espionage begin? Not even the United States has so far accepted the principle of a completely open laboratory door, although "challenge inspections" constituted the central element of its 1984



treaty draft. How much more are the advanced developing nations likely to be afraid that such a system of inspections would indefinitely allow industrial nations to hold pesky competition at bay?

An additional complication for the negotiations is the ploy used primarily by Arab nations tying their own chemical weapons to Israel's nuclear weapons. Does this make chemical weapons "the nuclear bomb of the poor?" Mark Storella rejects such claims categorically: "These weapons are not comparable. Nuclear weapons are incomparably more devastating."

The conflict between owners of chemical weapons and the have-nots is further exacerbated by the American proposal that 98 percent of their arsenals be destroyed within eight years after the signing of a treaty in Geneva and the remainder "after all countries which dispose over a corresponding production capacity have signed the treaty." One recognizes the underlying idea—insurance against blackmail as well as an incentive for those who hesitate—but one can also understand the suspicion of small countries that the large powers thereby want to keep an escape door open which to some extent allows them to circumvent the treaty.

Today the Soviet Union in Geneva is on the side of the United States on almost all issues. If the negotiations are nevertheless stalled, it is because of an anticipated new world-power alignment. Ambassador Ledogar thinks that "a North-South contrast is developing to an ever greater extent." He is still optimistic that a new treaty draft will finally be ready by the end of 1991. Not a moment too soon, according to Peter Herby: "If no results are achieved within the next one and one half years, it will become ever more difficult to negotiate any kind of treaty because of the rapid spread of chemical weapons."

However, all these weapons have only limited utility if they cannot be employed over longer distances. Consequently, arms control efforts in recent times have more and more included commerce in missile technology as well. Here, too, Iraq has the dubious distinction of being the first to make the world really aware of this problem. When Saddam Husayn in 1987 began to shower Iran with modified Soviet Scud-B missiles in "The War of the Cities," he initiated the ballistic age for Third World conflicts. Since then Baghdad has tested the first stage of an intercontinental missile, which is a testimony to the efficiency of support provided by Egyptian, Brazilian, and German engineers. The professional journal, *INTERNATIONAL DEFENSE REVIEW*, commented that this event has "sent shivers through all the world's ministries of defense, since it threatens to drastically change the Middle Eastern balance of power."

The CIA estimates that at least 15 countries—including Argentina, South Korea, Brazil, Pakistan, and Egypt—will have their own ballistic missiles by the year 2000. The United States quickly reacted during the "War of the Cities" and succeeded in hammering out a Missile

Technology Control Regime (MTCR) treaty—signed by seven countries: Canada, France, Germany, Italy, Japan, Great Britain, and the United States—to regulate exports in this area. But as long as more countries have not signed this agreement, its success, too, will be limited.

As in the case of chemical weapons, this case also demonstrates a central problem of today's arms control discussions: How should so-called "dual use" products—products which have civilian as well as military applications—be treated by international treaties? Iraq has demonstrated that once a country has reached a certain level of industrialization, it is no longer dependent on the import of finished weapon systems but can produce these systems itself simply by purchasing "civilian" technologies. Rene Pasche, from the Department for Foreign Affairs in Bern, offers a graphic explanation: "Today, one automatic rifle and a few computerized machine tools are all that is needed to procure masses of rifles." All the fertilizer plants that have been delivered to Iran may really be fertilizer plants, but they are easily converted into production facilities for poison gas. It may be that the pieces forged by the Meccanica foundry were really gear blanks, but nothing seems to be in Saddam's way to use them for his own "dicke Bertha" [German colloquialism for a very big gun].

While in Europe the view prevails that with the end of the Cold War rearmament has also ended, American proliferation expert Gary Milhollin believes that the arms race between East and West has simply been replaced by an arms race between North and South. This is not the least important reason why the United States continues to maintain rather rigid controls over the export of technology. Other industrial nations, however, are doing very little in this regard. Bonn, for instance, was for a long time only interested in placing as few obstacles as possible in the way of the German export machine. Insistent pressure to dismantle the Cocom [Coordinating Committee for Multilateral Export Controls] regulations was therefore applied, regulations which are supposed to prevent export of strategic items to the East Bloc. This summer the Kohl administration finally prevailed. Since then, according to Gary Milhollin it has been possible, "to sell nuclear fuses like bags of onions" to Poland from where they can then be dispatched without trouble to interested countries such as Libya, Iraq, or Pakistan.

To stop this practice as far as possible and prevent an explosive expansion of weapons of mass destruction in the Third World, Milhollin proposes a new "Cocom barrier" to include both the East and the West. "This new group would pursue the two goals of keeping the Third World as free of nuclear bombs and launch delivery vehicles as possible and to promote trade between member states." The problem with this proposal is, of course, that it is highly discriminatory and that it threatens to retard the economic development of the Third World.

It would, no doubt, help if all industrial nations were to adopt export laws patterned after those of the United States. The almost unending series of revelations of the activities of German "merchants of death," has at least induced Bonn to tighten the screws a little. However, the poison gas factories in Egypt (built with Swiss participation), in Iraq, in Iran, and in Libya exist; the first nuclear devices have already

been detonated in the Third World; operationally ready poison gas bombs are deployed on the Iraqi side with front-line troops. In other words, the prolonged negotiations in Geneva and elsewhere are now only attempts to limit the damage, that is all. Some day soon the industrial countries may realize that the greatest threat no longer emanates from the superpowers but from their own exports.

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